April/May 2001

IBM

United States

configuration and options guide

eserver xSeries Servers

Netfinity Servers

Storage Enclosures

Fibre Channel Solutions

Options

Services

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ibm.com/pc/us/eserver/xseries/library

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Information Sources

Canada		
Audience	**Where to go**	**How to get**
IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/ca/eserver/xseries/index.shtml	
Business Partners	www.pc.ibm.com/partner/ca	Select “Sales Tools” and then “Marketing Essentials.” User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	www.pc.ibm.com/partner/ca/feedback.html	
IBM xSeries and Netfinity Rack Configurator		
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Business Partners	www.pc.ibm.com/partner/ca	Select “Sales Tools” and then “Marketing Essentials.” User ID and Password required.
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PCSales Guide/Configurator and WorkPad Pricer (Updated weekly or biweekly)		
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Feedback	bburgess@ca.ibm.com	E-mail
Latest Product & Technical Information		
Customers	www.pc.ibm.com/ca/eserver/xseries/index.shtml	
Business Partners	www.pc.ibm.com/partner/ca or call the PSMT	User ID and Password required
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Latin America		
IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select “Configuration Tools”
Business Partners	Marketing Essentials in ePartner	See footnote 2
IBM Employees	Marketing Essentials in Lotus Notes PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	laconfig@us.ibm.com	E-mail
IBM xSeries and Netfinity Rack Configurator		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select “Configuration Tools”
Business Partners	Marketing Essentials in ePartner	See footnote 2
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
OrderBUILDER[1] (updated weekly)		
Business Partners	Marketing Essentials in ePartner	See footnote 2
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
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Latest Product & Technical Information		
Customers	www.pc.ibm.com/la	
Business Partners	www.pc.ibm.com/la/ or www.pc.ibm.com/br	See footnote 2
IBM Employees	Marketing Essentials in PartnerInfo	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator

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IBM xSeries Configuration and Options Guide		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools"
Business Partners	www.pc.ibm.com/partner/us/	Select Marketing Essentials > PC Configurator > Server Paper Configurator. User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity --> Configurators or By Brand category --> PC Configurator
Feedback	www.pc.ibm.com/partner/us/feedback.html	
IBM xSeries and Netfinity Rack Configurator		
Customers	www.pc.ibm.com/us/eserver/xseries/library	Select "Configuration Tools"
Business Partners	www.pc.ibm.com/partner/us/	Select Sales Tools, then Marketing Essentials, then IBM PC Server--> Rack Configurator. User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	ibm_netfinity_rack_configurator@vnet.ibm.com	E-mail
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Business Partners	www.pc.ibm.com/partner/us	Select Sales Tools, then OrderBUILDER. User ID and Password required.
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator
Feedback	pcconfig@us.ibm.com	E-mail
Latest Product & Technical Information		
Customers	www.pc.ibm.com/us/eserver/xseries or call 1-800-772-2227	
Business Partners	www.pc.ibm.com/partner/us/ or call 1-800-426-7763	Select Products & Services; User ID and Password required
IBM Employees	Marketing Essentials	By Brand category --> IBM Netfinity or By Brand category --> PC Configurator

Additional URLs

Audience	Where to go	How to get
Technical spec sheets (PSREF)	www.ibm.com/us/eserver/xseries/library	Select "Technical spec sheets (PSREF)"
IBM Datacenter Solutions	www.developer.ibm.com/welcome/netfinity	Under "News" select "Solutions Library." Under "Most Popular Solutions" select "Windows 2000 Datacenter Server"
Clustering (US, LA)	www.pc.ibm.com/ww/eserver/xseries/clustering/index.html	Select desired category or Server
Clustering (CAN)	www.pc.ibm.com/ww/eserver/xseries/clustering/index.html	Select desired category or Server
Benchmark Results	www.pc.ibm.com/ww/eserver/xseries/benchmarks/	Select desired category or Server
Options/NOS/Server compatibility	www.pc.ibm.com/us/compat	From pulldown select desired category
NOS - Hot-Plug/Failover Support	www.pc.ibm.com/us/compat	From pulldown select "Netfinity Hotplug PCI and Failover Info."
IBM Storage Products	www.storage.ibm.com	
Adobe® Acrobat® Reader V 3.0 or 4.0	www.adobe.com/products/acrobat/readstep.html	Follow instructions.
Adv. Sys. Mgmt. Adapter Firmware	www.pc.ibm.com/us/eserver/xseries/index.html	Select "Support," "Family," "Model," "Downloadable files" and "Advanced Systems Management".
Flash BIOS Updates	www.pc.ibm.com/support	Enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."
ServeRAID Updates	www.pc.ibm.com/support	Select "Server" in Brand pulldown, "ServeRAID" in Family pulldown and then "Downloadable files."

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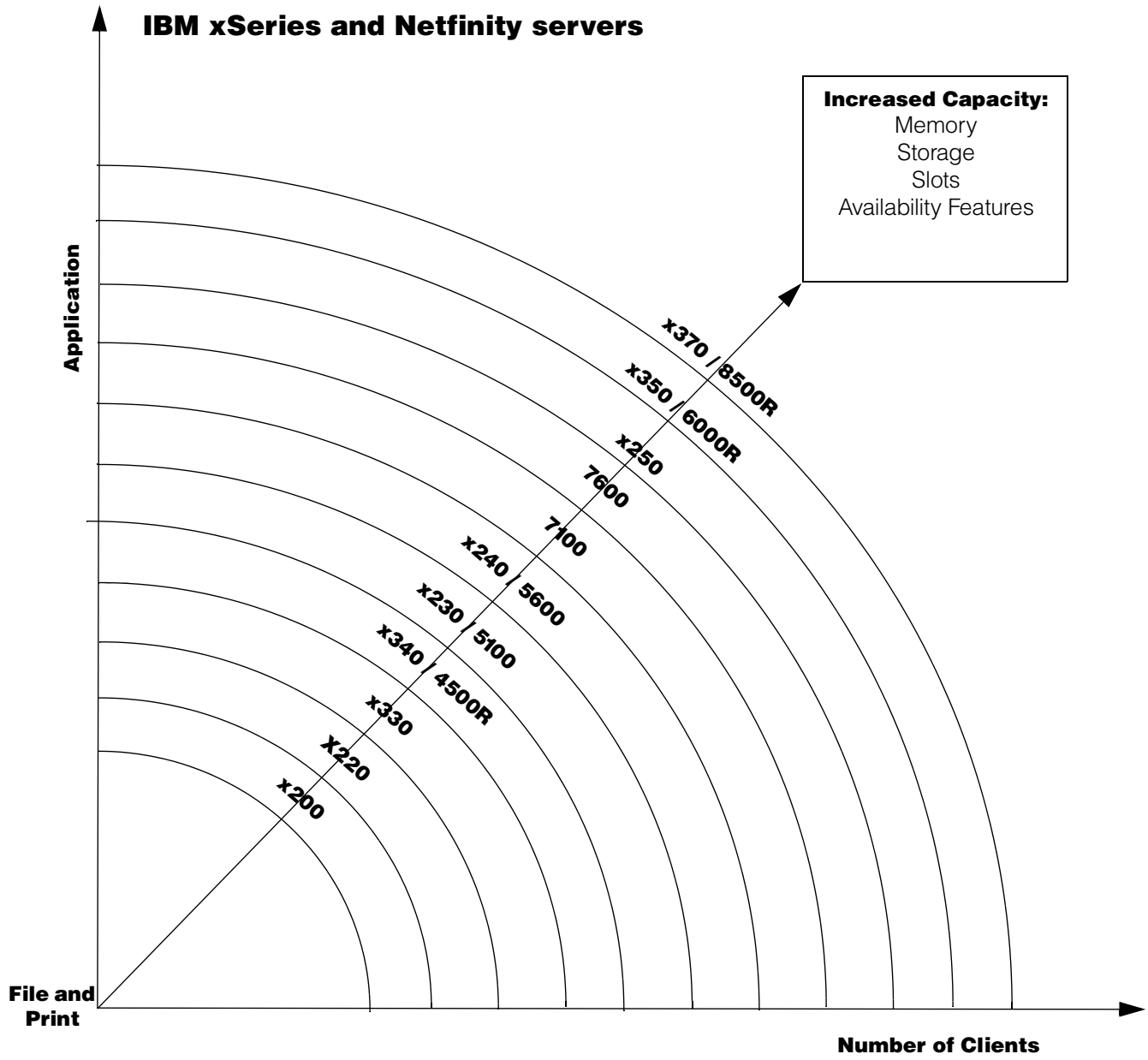
The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Server Product Positioning



When in a competitive situation, this table suggests the appropriate IBM Netfinity server to bid against other vendors' equipment. However, as an IBM business partner, you may determine that customer specific requirements may make an alternative IBM solution a better choice

	Value	Price Performance	Mission Critical	Rack Optimized
8-way			**IBM**: xSeries 370 / Netfinity 8500R **Compaq**: ProLiant 8000 **Dell**: No Offering **HP**: NetServer LH 6000, LT6000R	**IBM**: xSeries 370 / Netfinity 8500R **Compaq**:ProLiant 8500 **Dell**: PowerEdge 8450 **HP**: NetServer LXr 8000
4-way		**IBM**: xSeries 250, Netfinity 7100 **Compaq**: ProLiant ML570 **Dell**: PowerEdge 6400 **HP**: NetServer LH4	**IBM**: Netfinity 7600 **Compaq**: No Offering **Dell**: No Offering **HP**: NetServer LXr 8000	**IBM**: xSeries 350 / Netfinity 6000R **Compaq**: ProLiant DL580 **Dell**: PowerEdge 6450 **HP**: NetServer LH4r
2-way	**IBM**: xSeries 220 **Compaq**: ProLiant ML350 **Dell**: PowerEdge 1300 **HP**: NetServer E60	**IBM**: xSeries 230 / Netfinity 5100 **Compaq**: ProLiant ML370 **Dell**: PowerEdge 2400 **HP**: NetServer LC2000	**IBM**: xSeries 240 / Netfinity 5600 **Compaq**: ProLiant ML530 **Dell**: PowerEdge 4400 **HP**: NetServer LH 3000	**IBM**: xSeries 330, xSeries 340/ Netfinity 4500R **Compaq**: ProLiant DL380, DL360 **Dell**: PowerEdge 2450 **HP**: NetServer LPr
Uni	**IBM**: xSeries 200 **Compaq**: ML330 **Dell**: No Offering **HP**: No Offering			

IBM xSeries and Netfinity® Selection Guide

This graph represents general guidelines for selecting the appropriate server based on the number of users that can be supported in a particular application environment. This chart is for general guidance since each customer environment is unique and is unlikely to be precisely represented by any of the specific applications in the chart, but by using the chart, a reasonable approximation can be derived. External Storage Units are utilized when internal capacities are exceeded. Utilize the chart by following the steps outlined on the following page.
These are not published benchmark results. Access www.ibm.com/pc/us/techlink/srvperf.html to obtain benchmark data.

Application/ Expectation of Maximum # of Users		xSeries 200 Uni-Pentium® III 866MHz[1]/256KB	xSeries 220 Dual Pentium III 933MHz/ 256KB	xSeries 330 Dual Pentium III 1GHz/256KB
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	**# Users**	**1500**	**1970**	**2110**
	# processors	1	2	2
	Memory	2GB	768MB	2GB
	# Hard Disk Drives	12 to 18	40 to 50	36 to 48
	# RAID Adapters	≥1	≥2	≥2
	# Network Connections	1	1	1
File and Print Application is stored locally. (For server stored applications - cut number of users in half).	**# Users**	**1200**	**1000**	**2100**
	# Processors	1	2	2
	Memory	2GB	768MB	2GB
	# Hard Disk Drives	5 to 10	4 to 8	20 to 30
	# RAID Adapters	≥1	1	1 to 2
	# 100Mbps Ethernet Connections	≥2	2	4
Lotus Notes® 10% Power Users 40% Mail 50% Mail & DB	**# Users**	**900**	**1180**	**1950**
	# Processors	1	2	2
	Memory	2GB	768MB	2GB
	# Hard Disk Drives	5 to 10	10 to15	20 to 30
	# RAID Adapters	≥1	1	1 to 2
	# Network Connections	≥1	≥2	≥2
Microsoft® Exchange Server 5.5 100% Med Usersl 30MB Mailbox	**# Users**	**1980**	**2200**	**2310**
	# Processors	2	2	2
	Memory	1GB	1GB	2GB
	# Hard Disk Drives	9	10	10
	# RAID Adapters	1	≥1	1
	# Network Connections	≥1	≥1	≥2
SAP 3-Tier Distributed Ver 4.0b Processing Sales and Distribution Application (Minimum of 16-20 Servers)	**# Users**	-	-	
	# Processors	-	-	
	Memory	-	-	
	# Hard Disk Drives	N/A	N/A	N/A
	# RAID Adapters	-	-	
	# Network Connections	-	-	
SAP Central Version 4.0b Processing Sales and Distribution Application (One Server)	**# Users**	**75**	**80**	**160**
	# Processors	1	1	2
	Memory	1GB	1GB	1GB
	# Hard Disk Drives	12	12	12 to 24
	# RAID Adapters	≥1	≥1	≥1
	# Network Connections	1	1	1
High Availability Features	Hot-Swap HDD Bays	-	-	-
	Hot-Plug PCI Slots	-	-	-
	Hot-Swap Power	-	-	-
	Hot-Swap Fans	-	-	-
	RAID	Opt	Opt	Opt
	Clustering Support	-	-	-
	Sys Mgt Processor	-	Opt	-
Other Distinquishing Features	Max # Processors	2	1	2
	Max Memory	2GB	768MB	2GB
	Max Int Storage (GB)[2]	145.6	145.6	72.8
	Max Int Storage (GB) with Int Tape drive	145.6	109.2	N/A
	Available PCI Slots	5	5	2
	19in Rack Models	-	-	-
	NetBAY3x Support	-	-	-

IBM xSeries and Netfinity Selection Guide

Application/ Expectation of Maximum # of Users		xSeries 340 / Netfinity 4500R Dual Pentium III 1GHz/ 256KB	xSeries 230 / Netfinity 5100 Dual Pentium III 1GHz/ 256KB	xSeries 240 / Netfinity 5600 Dual Pentium III 1GHz/ 256KB	xSeries 250 Quad Pentium III Xeon 900MHz/ 2MB	xSeries 350 / Netfinity 6000R Quad Pentium III Xeon™ 900MHz/ 2MB	Netfinity 7100 Quad Pentium III Xeon 900MHz/ 2MB	Netfinity 7600 Quad Pentium III Xeon 900MHz/ 2MB	xSeries 370 / Netfinity 8500R Eight-Way Pentium III Xeon 900MHz/ 2MB
DB Transaction Processing Select, Update and Delete; Does not include image or Decision Support	**# Users**	**2530**	**2530**	**2530**	**7030**	**7030**	**7030**	**7030**	**11300**
	# processors	2	2	2	4	4	4	4	8
	Memory	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
	# Hard Disk Drives	30 to 50	30 to 50	30 to 50	80 to 140	80 to 140	80 to 140	80 to 140	180 to 250
	# RAID Adapters	≥2	≥4	≥4	≥4	≥4	≥4	≥4	≥5 or Fibre
	#Network Connections	1 to 2	1 to 2	1 to 2	2 to 3	2 to 3	2 to 3	2 to 3	2 to 3
File and Print Application is stored locally. (For server stored applications cut number of users in half).	**# of Users**	**2100**	**2100**	**2100**	**5000**	**5000**	**5000**	**5000**	**6000**
	# of Processors	2	2	2	2	2	2	2	3 to 4
	Memory	2GB	2GB	2GB	2 to 4GB	2 to 4GB	2 to 4GB	2 to 4GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	20 to 30	50 to 90	50 to 90	50 to 90	50 to 90	75 to 150
	# RAID Adapters	1 to 2	1 to 2	1 to 2	≥4	≥4	≥4	≥4	≥4 or Fibre
	# 100Mbps Ethernet Connections	4	4	4	8	8	8	8	10
Lotus Notes 10% Power Users 40% Mail 50% Mail & DB	**# Users**	**2200**	**2200**	**2200**	**4615**	**4615**	**4615**	**4615**	**7335**
	# Processors	2	2	2	4	4	4	4	8
	Memory	2 to 3GB	2 to 3GB	2 to 3GB	3GB	3GB	3GB	3GB	4GB
	# Hard Disk Drives	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	20 to 30	30 to 40
	# RAID Adapters	1 to 2	1 to 2	1 to 2	2 to 3	2 to 3	2 to 3	2 to 3	≥3
	# Network Connections	≥2	≥2	≥2	≥3	≥3	≥3	≥3	≥4
Microsoft Exchange Server 5.5 100% Med Users 30MB Mailbox	**# Users**	**2310**	**2310**	**2310**	**7800**	**7800**	**7800**	**7800**	**10000**
	# Processors	2	2	2	4	4	4	4	8
	Memory	2GB	2GB	2GB	≥3GB	3GB	≥3GB	4GB	4GB
	# Hard Disk Drives	9	12	12	30 to 40	30	30 to 40	40 to 50	40 to 50
	# RAID Adapters	1	1	2	≥2	2	≥2	≥3	≥3
	# Network Connections	≥1	≥1	≥1	≥2	≥2	≥2	≥2	≥2
SAP 3-Tier Distributed Ver 4.x Processing Sales and Distribution Application (Minimum of 16-20 Servers)	**# Users**		**2790**	**2800**	**4000**	**4000**	**4000**	**4000**	**6400**
	# Processors		2	2	4	4	4	4	8
	Memory		1 to 2GB	1 to 2GB	≥4GB	≥4GB	≥4GB	≥4GB	≥4GB
	# Hard Disk Drives	N/A	24 to 36	24 to 36	48 to 60	48 to 60	48 to 60	48 to 60	48 to 60
	# RAID Adapters		≥2	≥2	≥3	≥3	≥3	≥3	≥3
	# Network Connections		1	1	1	1	1	1	1
SAP Central Version 4.x Processing Sales and Distribution Application (One Server)	**# Users**	**160**	**162**	**180**	**300**	**300**	**300**	**300**	**480**
	# Processors	2	2	2	4GB	4	4	4	8
	Memory	1GB	1 to 2GB	1 to 2GB	≥2GB	≥2GB	≥2GB	≥2GB	≥4GB
	# Hard Disk Drives	12 to 24	12 to 24	12 to 24	24 to 36	24 to 36	24 to 36	24 to 36	24 to 36
	# RAID Adapters	≥1	≥1	≥1	≥2	≥2	≥2	≥2	≥2
	# Network Connections	1	1	1	1	1	1	1	1
High Availability Features	Hot-Swap HDD Bays	X	X	X	X	X	X	X	X
	Hot-Plug PCI Slots	-	-	X	Opt	X	Opt	X	X
	Hot-Swap Power	X	Opt	X	X	X	X	X	X
	Hot-Swap Fans	X	-	X	X	X	X	X	X
	RAID	Opt	Opt	Opt	Opt	Opt	Opt	X	Opt
	Clustering Support	X	X	X	X	X	X	X	X
	Sys Mgt Processor	X	X	X	X	X	X	X	X
Other Distinguishing Features	Max # Processors	2	2	2	4	4	4	4	8
	Max Memory	4GB	4GB	4GB	16GB	16GB	16GB	16GB	32GB
	Max Int Storage (GB)	218.4	218.4	218.4	364GB	218.4	364	364	72.8
	Max Int Storage (GB) with Int Tape drive	109.2	218.4	218.4	364GB	N/A	364	364	N/A
	Available PCI Slots	5	5	5	6	6	6	5	12
	19in Rack Models	X	X	X	X	X	X	X	X
	NetBAY3x Support	-	-	-	X	-	X	X	X[3]

1. MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.
3. With a Rack-to-Tower Conversion Kit installed.

Procedure for Server Selection Guidance Chart

File and Print numbers are Novell Netware-based with all others based on Microsoft Windows NT®. Other Network Operating System (NOS) results could vary.
Extensive SAP sizings are available from IBM/SAP Competency Centers. Contact your IBM Marketing Representative for additional information**.**
Step 1: Determine which application (row) most closely represents the customer's environment.
Step 2: Move from left to right along the row (chosen in Step 1) noting which columns contain numbers that are equal to or greater than the maximum customer's planned number of users.
Step 3: Move up the columns (chosen in Step 2) to the top row to determine which IBM xSeries or Netfinity servers should be considered as possible solutions.
Step 4: Evaluate other features such as storage, memory capacity, high availability components, number of available expansion slots, etc., which are unique to each server, in order to determine which is the most appropriate to recommend.
For your reference, configuration information corresponding to the number of users is also provided.

IBM xSeries 130/135

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail) Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[3]	Bays (Total/Avail) Slots (Total/Avail)
xSeries 130 At-A-Glance														
8654-1YX[1, 4]	800	1/2	256	256MB(R) / 2GB[6]	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	9.1/45.5GB	24X-10X	4/1	2/2
xSeries 135 At-A-Glance														
8654-1XX[1, 5]	800	1/2	256	256MB(R) / 2GB[6]	Rack (1U)	1/1	H	-	N	2 x 10/100	U160	-	9.1/45.5GB	24X-10X	4/1	2/2

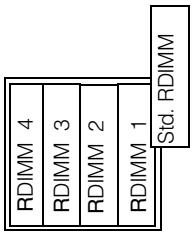
1. Housed in a 19in rack mountable drawer and ships standard without a keyboard or mouse. See Rack Cabinet and Options section for supported IBM racks.
2. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 133MHz Front-Side Bus (FSB).
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
4. A superior Web hosting appliance delivering full X-architecture integration and system management capabilities. Powered by Windows 2000 technology, Microsoft Internet Information Services, and Web Server Accelerator, the x130 offers the performance and reliability for the most demanding e-business companies.
5. A price/performance Web hosting solution based on Linux and IBM HTTP Server. The x135 is an ideal solution for customers who have chosen the open source architecture and are seeking the lowest possible price for Web hosting. A key offering for ISPs.
6. Optimum performance occurs with 1GB total memory installed.

xSeries 130 / 135 Processors

Part Number	Processor Upgrades with 256KB Cache (Full Speed)	SMP Support[1]
10K3810	800MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1YX, 1XX

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.

xSeries 130 / 135 Memory



Part Number	Memory Description[1]
33L3142	128MB, 133MHz ECC SDRAM RDIMM II
33L3144	256MB, 133MHz ECC SDRAM RDIMM II
33L3146	512MB, 133MHz ECC SDRAM RDIMM II
33L3152	1GB, 133MHz ECC SDRAM RDIMM II

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

Total System Memory[1]	Quantity of RDIMMs Added			
	256MB (1 x 256MB)	128MB (33L3142)	256MB (33L3144)	512MB (33L3146)	1GB (33L3152)
384MB	1	-	-	-
512MB	2 or	1	-	-
640MB	3	-	-	-
768MB	-	2 or	1	-
1024MB	-	3	-	-
1280MB	-	-	2 or	1
1792MB	-	-	3	-
2048MB[2]	-	-	4 or	2

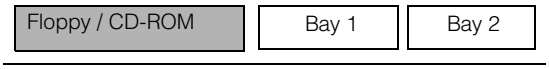
This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information. Optimum performance occurs with 1GB total memory.
2. Requires removal of standard memory.

xSeries 130 / 135 Hard Disk Drive (HDD) and External Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs		
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (P/N 37L204)	18.2GB (P/N 37L7205)	36.4GB (P/N 37L7206)
9.1GB	Standard on base models					
18.2GB	1	-	-	1	-	-
27.3GB	-	1	-	-	1	-
45.5GB	-	-	1	-	-	1

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.



Bay	Form Factor	Height	Front Access	Usage
1[1]	HS	SL	Yes	HDD
2	HS	SL	Yes	Open

1. Boot drive should be located in bay 1.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 Hard Disk Drives (HDD)					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10000	SL	1 … 2	2

xSeries 130 / 135 Power, Monitor & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
06P4792	Cable Chain Technology Cable Kit[6]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), stealth black[8]
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II

1. The xSeries 130 /135 includes a worldwide, voltage sensing 200W power supply and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. The xSeries 130 / 135 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A Cable Chain Technology Cable Kit(P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 130 / 135s. The kit contains a 2M (6.5 ft) breakout cable for attachment to a keyboard. mouse and monitor, as well as a 2M (6.5ft) chaining cable for connecting two xSeries 130 / 135s together when the standard 245mm (9.6in) chaining cable is not long enough. A maximum of 42 xSeries 130 / 135s are supported in a single chain. No more than one C2T Cable Kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable is required (P/N 09N4293 or 94G7447).
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
	Keyboard and Mouse[1]
06P4792	Cable Chain Technology Cable Kit
28L4707	Netfinity Rack Keyboard Tray
28L3644	Space Saver II Keyboard[2]
28L3621	Preferred Keyboard (stealth black)[3]
28L3673	Sleek 2-button Stealth Black Mouse

1. A Cable Chain Technology Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 130 / 135s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard. mouse and monitor, as well as a 2M (6.5ft) chaining cable for connecting two xSeries 130s or 135s together when the standard 245mm (9.6in) chaining cable is not long enough. A maximum of 42 xSeries 130s or 135s are supported in a single chain. No more than one C2T cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable is required (P/N 09N4293 or 94G7447).
2. Installation within a rack requires optional keyboard tray P/N 28L4707 which stows in ready-to-use position).
3. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

IBM xSeries 200

Part Number	Processor Speed (MHz)	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R=RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 200 At-A-Glance																
8478-10X	667[1]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-11X	667[1]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	15/90GB[2, 3]	48X-20X	7/4	5/5
8478-12X[4]	667[1]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/1	15/90GB[2, 3]	48X-20X	7/3[4]	5/5
8478-13X[5]	667[1]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	9.1/145.6GB[2]	48X-20X	7/4	5/4
8478-20X	733[1]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-21X	733[1]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/145.6GB[2, 3]	48X-20X	7/4	5/5
8478-22X	733[1]	1/1	128	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/1	20.4/145.6GB[2, 3]	48X-20X	7/3[4]	5/5
8478-23X[5]	733[1]	1/1	128	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB[2]	48X-20X	7/4	5/4
8478-40X	800[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-41X	800[6]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	15/90GB[2, 3]	48X-20X	7/4	5/5
8478-42X[5]	800[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	9.1/145.6GB[2]	48X-20X	7/4	5/4
8478-50X	866[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-51X	866[6]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	15/90GB[2, 3]	48X-20X	7/4	5/5
8478-52X[5]	866[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	9.1/145.6GB[2]	48X-20X	7/4	5/4
8478-60X	933[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-61X	933[6]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/145.6GB[2, 3]	48X-20X	7/4	5/5
8478-62X[5]	933[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB[2]	48X-20X	7/4	5/4
8478-70X	1GHz[6]	1/1	256	128MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/4
8478-71X	1GHz[6]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	IDE	4/2	20.4/145.6GB[2, 3]	48X-20X	7/4	5/5
8478-72X[5]	1GHz[6]	1/1	256	64MB/1.5GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB[2]	48X-20X	7/4	5/4

1. Intel® Celeron™ processor.
2. Maximum capacity assumes replacement of standard hard disk drives and tape drives with the largest supported IBM hard disk drive.
3. Maximum capacity may be increased by converting IDE models to support SCSI devices and replacing IDE devices with the largest supported IBM hard disk drives.
4. This model is configured with an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
5. Not available in the United States.
6. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 133MHz front-side bus (FSB).

xSeries 200 Processors

Part Number	Processor Upgrades	Processor Speed Upgrade[1]
21P9539	800MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1xX
10K3818	866MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1 … 4xX
10K0051	xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor	4 … 7xX

1.Requires removal of the standard processor. A maximum of one processor may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine “Type-Model” in Quick Path. Select “Downloadable files” then “BIOS.”

xSeries 200 Memory

DIMM Socket
DIMM Socket
DIMM Socket

Part Number	Memory Description
33L3079	64MB 133MHz ECC SDRAM DIMM Memory
33L3081	128MB 133MHz ECC SDRAM DIMM Memory
33L3083	256MB 133MHz ECC SDRAM DIMM Memory
33L3085	512MB 133MHz ECC SDRAM Unbuffered DIMM Memory

Total System Memory (Standard Models)[1]		DIMMs			
64MB (1 x 64)	128MB (1 x 128)	64MB (33L3079)	128MB (33L3081)	256MB (33L3083)	512MB (33L3085)
128MB	192MB	1			
192MB	256MB	2 or	1		
320MB	384MB	-	2 or	1	
384MB[2]	-		3		
576MB	640MB			2 or	1
768MB[2]	768MB[2]			3	
1088MB	1152MB				2
1536MB (max)[2]	1536MB[2]				3

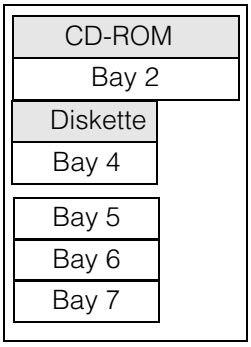
This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory from the appropriate column (Standard Model 64MB or 128MB), then select a quantity in that row from one of the DIMM columns.

1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard DIMMs.

xSeries 200 Hard Disk Drive (HDD)

Total Internal Storage[1]	7200RPM SCSI HDDs			10,000RPM SCSI HDDs			15,000RPM SCSI HDDs
	9.1GB (00N8204)	18.2GB (00N8205)	36.4GB (00N8206)	9.1GB (00N8207)	18.2GB (00N8208)	36.4GB (00N8209)	18.2GB (19K0658)
0GB	Standard on some base models						
9.1GB	1 (Std on some models)	-	-	1	-	-	-
18.2GB	2	1	-	2	1	-	1
27.3GB	3	-	-	3	-	-	-
36.4GB	4	2	1	4	2	1	2
54.6GB	-	3	-	-	3	-	3
72.8GB	-	4	2	-	4	2	4
109.2GB	-	-	3	-	-	3	-
145.6GB (max)	-	-	4	-	-	4	-

This table does not represent all possible hard disk drive (HDD) configurations.
1. Select a total storage row and select the quantity of HDDs from a column corresponding to the hard disk drive of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.



Total Internal Storage[1]	7200RPM IDE HDDs[2]		
	15GB (P/N 19K4460)	20.4GB (P/N 19K4461)	30GB (P/N 00N8203)
15GB	(Std on EIDE models)	-	-
30GB	1	-	-
35.4GB	-	1	-
45GB	-	-	1
45GB[3]	2	-	-
50.4GB[3]	1	1	-
55.8GB[3]	-	2	-
60GB[3]	1	-	1
61.2GB[3]	-	3[4]	-
65.4GB[3]	-	1	1
75GB[3]	-	-	2
90GB (max)	-	--	3[4]

This table does not represent all possible HDD configurations.Total Internal Storage listed is within +/-0.2GB unless otherwise noted.

1. Select a total storage row then select the quantity of HDDs from all columns. Example: Total storage = 50.4GB, order 1 x 19K4460 and 1 x 19K4461.
2. The xSeries 200 EIDE controllers support a maximum of four IDE devices per machine including cd-rom drives, HDDs and IDE tape drives.
3. Not a supported configuration on model12X which includes an IBM 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
4. Requires removal of the standard HDD.

Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	yes	IDE CD-ROM
2	133mm (5.25in)	HH	yes	open[1, 2]
3	89mm (3.5in)	SL	yes	Diskette
4	89mm (3.5in)	SL	yes	open
5…7	89mm (3.5in)	SL	yes	open

1. Supports removable media devices only. Hard drives are not supported.
2. Tape drive in model 8478-12X.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
	IDE HDDs[1, 2]				
19K4460	15GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3[3]
19K4461	20.4GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3[3]
00N8203	30GB 7200rpm ATA-100 (EIDE) HDD	7200	SL	4 … 7	3[3]
	Ultra160 HDDs[2]				
00N8204	9.1GB 7200rpm Ultra160 SCSI HDD	7200	SL	4 … 7	4
00N8205	18.2GB 7200rpm Ultra160 SCSI HDD	7200	SL	4 … 7	4
00N8206	36.4GB 7200rpm Ultra160 SCSI HDD	7200	SL	4 … 7	4
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4 … 7	4
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4 … 7	4
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4 … 7	4
19K0658	18.2GB 15,000rpm Ultra160 SCSI HDD	15000	SL	4 … 7	4
	External Storage Expansion Units[4]	**Form Factor**			
35311RU	EXP300 Storage Expansion Unit[5]	Rack (3U)			
09N7296	EXP300 Rack-to-Tower Conversion Kit	-			

1.The xSeries 200 EIDE controllers support a maximum of four IDE devices per machine including CD-ROM drives, HDDs and IDE tape drives.
2. Mixing of IDE and SCSI HDDs is not supported.
3. Limited to two drives in model -12X due to installed tape drive option.
4. Not supported by the external SCSI port included in SCSI models. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Unit - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
5. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.

xSeries 200 Internal SCSI Cabling

EIDE Models
In xSeries 200 models using the EIDE interface for storage device attachment, a two-drop cable is used to attach the standard 15GB EIDE HDD to one of the EIDE connectors. A second EIDE controller provides the interface for the IDE CD-ROM drive. A two-drop cable connects the IDE controller to the IDE CD-ROM. Up to two additional EIDE or IDE devices can be installed (one off of each controller).

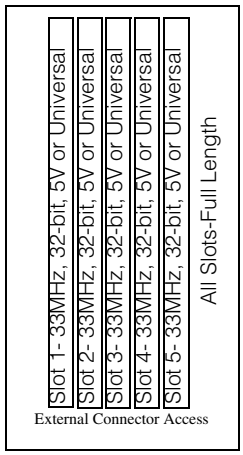
SCSI Models
xSeries 200 models with a SCSI adapter are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator at one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the standard Ultra160 SCSI adapter. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

Other Configuration Alternatives
In the case where a RAID controller is used to support internal drives in a xSeries 200, the standard cable is moved from the onboard controller to the RAID adapter. To connect a tape drive to the onboard or other supported SCSI controller, use the 16-bit multi-mode terminated, two-drop SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

xSeries 200 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]
	Storage Controllers[2, 3]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	32/64-bit	2 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	32/64-bit	2 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[6]	Half	32-bit	2 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	2 … 5
	Networking[7]			
	Ethernet			
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5
	Token Ring[8]			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 … 5
	Communications[9]			
33L4618	PCI V.90 56 Data/Fax Modem	Half	32-bit	2 … 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[10]	Half	32-bit	2 … 5


Slot 1- 33MHz, 32-bit, 5V or Universal
Slot 2- 33MHz, 32-bit, 5V or Universal
Slot 3- 33MHz, 32-bit, 5V or Universal
Slot 4- 33MHz, 32-bit, 5V or Universal
Slot 5- 33MHz, 32-bit, 5V or Universal
All Slots-Full Length
External Connector Access

1. The xSeries 200 has five full-length, 33MHz PCI expansion slots. The number of available slots is model specific.
2. Some models of the xSeries 200 include a single channel Ultra160 SCSI Adapter with a five-drop multi-mode terminated LVD SCSI Cable. All other models include dual-channel EIDE controllers and require an optional SCSI adapter for SCSI functionality. See At-A-Glance for model attributes
3. Storage controllers are supported in slots two through five only. Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a storage controller is installed in slot two, only another storage controller can be installed in slot four. Thus, a networking adapter cannot be installed in slot four when a storage controller is installed in slot two. (Slot one is next to the AGP video adapter, and slot five is the farthest from the processors.)
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
6. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
7. xSeries 200 includes an integrated full-duplex, 10/100Mbps Ethernet controller. Networking adapters are supported in slots one through five; Slots two and four and slots three and five are paired so that they support only the same type of adapter, e.g., if a networking adapter is installed in slot three, only another networking adapter can be installed in slot five. Thus, a storage controller cannot be installed in slot five when a networking adapter is installed in slot three.
8. Wake on LAN™ is supported for networking adapters designed with this function when installed in slots one through five (refer to limitation explained in footnotes three and seven).
9. xSeries 200 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.7.
10. See Appendix E for details on Serial I/O options and configuration limitations.

xSeries 200 Power, Monitor & Accessories

Part Number	Description
	Power[1]
	Free Standing Uninterruptible Power Supply (UPS)[2]
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
	Rack Mount Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), stealth black[7]
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II

1. The xSeries 200 includes a 330W voltage sensing power supply and a single line cord..
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. The xSeries 200 contains a S-3 Savage-4 LT video adapter with 8MB of video memory plugged into the standard AGP slot.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
	Conversion Kits
09N4300	4Ux20D Tower-to-Rack Kit
	Rack and NetBAY[1]
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (Perforated Doors)
36L9703	Netfinity Rack Extension Kit
9306200	Netfinity NetBAY22
36L9702	NetBAY22 Rack Extension Kit
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
28L3673	Sleek 2-button Stealth Black Mouse

1 Rack installation of an xSeries 200 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed here. See Rack Cabinet and Options section for IBM rack supported devices.
2. The xSeries 200 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in "ready-to-use" position).
4. Advanced TrackPoint IV features are not available on IBM Netfinity systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 200 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures[1]
20L0549	10/20GB TR5 Internal IDE Tape Drive[2]	2, 4	-	89mm (3.5in) SL or 133mm (5.25in) HH	-	-	-
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive[3, 4]	2	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3510020, 3551001
09N4042	10/20GB NS Internal SCSI Tape Drive[3, 4]	2, 4	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020, 3551001
00N7991	20/40 GB DDS/4 4mm Internal Tape Drive[4, 5]	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[6], 3551001[7]
00N8016	100/200GB LTO Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[7]
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[8]	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[9]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[10]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	External	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit[4, 7]	-	16 LVD	Internal	Y	N	3551001

Note: SCSI models include an Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. SCSI tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable and an external 0.8-mm VHDCI connector.

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section, and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
2. SCSI models include a two-drop EIDE cable for attachment to the CD-ROM and an IDE tape drive. Model 8478-12X and 22X include 10/20GB TR5 Internal IDE Tape Drive (P/N 20L0549).
3.This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
4. RAID configurations (SCSI models only) where the standard SCSI cable is attached to a RAID adapter require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340).
5. EIDE models require optional PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
6. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956)
7. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340), which contains a single two-drop mult-mode terminated LVD cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
8. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full high (FH) or four half high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes

xSeries 200 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8478-12X	x200 Celeron 667/128, 64MB, EIDE, 15GB, Tape, 48X	1
33L3081	128MB 133Mhz ECC SDRAM DIMM Memory	1[1]
19K4461	20.4GB 7200rpm ATA/100 (EIDE) HDD	1[2]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 192MB of system memory.
2. For a total of 35.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 200 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 192MB of system memory (expandable to 1.5GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

File and Print Server

Part Number	Description	Quantity
8478-50X	x200 Pentium III 866/256, 128MB, Ultra160, Open, 48X	1
33L3081	128MB 133MHz ECC SDRAM DIMM Memory	1[1]
00N8208	18.2GB 10,000RPM Ultra160 SCSI HDD	3[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.
2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 200 with 256MB of memory and 54.6GB of hard disk drive space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

Application Server

Part Number	Description	Quantity
8478-40X	x200 Pentium III 800/256, 128MB, Ultra160, Open, 48X	1
33L3083	256MB 133MHz ECC SDRAM DIMM Memory	1[1]
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	3[2]
10K2340	Media Bay Tray and LVD Cable Kit[3]	1
09N4042	10/20GB NS Internal SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 18.2GB.
3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 200 was selected to provide an affordable price point for an application server with Pentium III processing, 384MB of system memory (expandable to 1.5GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

IBM xSeries 220

Part Number	Processor Speed (MHz)[1]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R=RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[2]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 220 At-A-Glance																
8645-21X	800	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-22X	800	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB	48X-20X	7/4	5/5
8645-2AX	800	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-31X	866	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-32X	866	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB	48X-20X	7/4	5/5
8645-3AX	866	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-41X	933	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-42X	933	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB	48X-20X	7/4	5/5
8645-4AX	933	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-51X	1GHz	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5
8645-52X	1GHz	1/2	256	128MB(R)/4GB	Tower	1/1	-	-	-	10/100	U160	4/2	18.2/145.6GB	48X-20X	7/4	5/5
8645-5AX	1GHz	1/2	256	128MB(R)/4GB	Tower	1/1	H	-	-	10/100	U160	4/2	0/145.6GB	48X-20X	7/5	5/5

1. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 133MHz Front-Side Bus.
2. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 220 Processor Upgrades

Part Number	Processor Upgrades	SMP Support[1]	Processor Speed Upgrade[2]
21P9539	800MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	2xX	-
10K3818	Netfinity 866MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	3xX	2xX
10K3819	Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	4xX	2 … 3xX
10K0051	xSeries 1GHz Upgrade with 133MHz FSB 256KB Advanced Transfer Cache Pentium III Processor	5xX	2 … 4xX

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of one processor may be installed. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

xSeries 220 Memory

DIMM Socket
DIMM Socket
DIMM Socket
DIMM Socket

Part Number	Memory Description
33L3142	128MB 133MHz SDRAM ECC RDIMM Memory
33L3144	256MB 133MHz SDRAM ECC RDIMM Memory

Total System Memory[1]	Quantity of RDIMMs Added			
128MB (1 x 128)	**128MB (33L3142)**	**256MB (33L3144)**	**512MB (33L3146)**	**1GB (33L3152)**
256MB	1	-	-	-
384MB	2 or	1	-	-
512MB	3	-	-	-
640MB	-	2 or	1	-
896MB	-	3	-	-
1024MB[2]	-	4	-	-

33L3146	512MB 133MHz SDRAM ECC RDIMM Memory
33L3152	1GB 133MHz SDRAM ECC RDIMM

1152MB	-		2 or	1
1664MB	-		3	-
2048MB[2]	-		4	-
2176MB	-		-	2
3200MB	-		-	3
4096MB[2] (max)	-		-	4

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller DIMMs may provide a more cost-effective alternative to using larger DIMMs. Select the desired total memory from the appropriate column (Standard Model 64MB or 128MB), then select a quantity in that row from one of the DIMM columns.

1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

xSeries 220 Hard Disk Drive (HDD) and External Storage

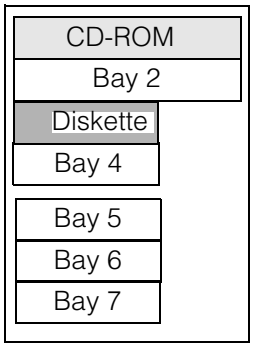
Total Internal Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (00N8204 or 37L7201)[2]	18.2GB (00N8205 or 37L7202)[2]	36.4GB (00N8206 or 37L7203)[2]	9.1GB (00N8207 or 37L7204)[2]	18.2GB (00N8208 or 37L7205)[2]	36.4GB (00N8209 or 37L7206)[2]	9.1GB (19K0655)[4]	18.2GB (19K0658 or 19K0656)[2]
0GB	Standard on base models[5]							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4[3]	2	1	4[3]	2	1	-	2
45.5GB	-	-	-	-	-	-	-	-
54.6GB	-	3	-	-	3	-	-	3
72.8GB	-	4[3]	2	-	4[3]	2	-	4[3]
91GB	-	-	-	-	-	-	-	-
109.2GB	-	-	3	-	-	3	-	-
145.6GB (max)	-	-	4[3]	-	-	4[3]	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2 GB unless otherwise noted.
2. Both hot-swap and nonhot-swap HDDs are listed. Select the appropriate part number for the model of xSeries 220 being configured.
3. A maximum of three hot-swap drives may be installed in hot-swap models. This configuration requires installation of a nonhot-swap HDD in Bay 4.
4. Hot-Swap models only.
5. Models 8645-22X, 32X and 42X ship standard with an 18.2GB Ultra160 SCSI HDD.

Part Number	Description	RPM	Height	Hot-Swap Models		Non-Hot-Swap Models	
				Bays Supported	Maximum Quantity	Bays Supported	Maximum Quantity
	Non-Hot-Swap Ultra160 Hard Disk Drives (HDD)[1]						
00N8204	9.1GB 7200rpm Ultra160 SCSI HDD	7200	SL	4	1	4 … 7	4
00N8205	18.2GB 7200rpm Ultra160 SCSI HDD	7200	SL	4	1	4 … 7	4
00N8206	36.4GB 7200rpm Ultra160 SCSI HDD	7200	SL	4	1	4 … 7	4
00N8207	9.1GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4	1	4 … 7	4
00N8208	18.2GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4	1	4 … 7	4
00N8209	36.4GB 10,000rpm Ultra160 SCSI HDD	10,000	SL	4	1	4 … 7	4
19K0658	18.2GB 15,000rpm Ulltra160 SCSI HDD	15000	SL	4	1	4 … 7	4
	Hot-Swap Ultra160 HDDs[2]						
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	5 … 7	3	-	-
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	5 … 7	3	-	-
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	5 … 7	3	-	-
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	5 … 7	3	-	-
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	5 … 7	3	-	-
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	5 … 7	3	-	-
19K0655	9.1GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15000	SL	5 … 7	3	-	-
19K0656	18.2GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15000	SL	5 … 7	3	-	-

External Storage Expansion Units[3]		Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-

1. Nonhot-swap HDDs are supported in bays four through seven of nonhot swap models and in bay four of hot-swap models.
2. Hot-swap HDDs are supported in bays five through seven of hot-swap models. Bay four supports nonhot-swap HDDs only.
3. Not supported by the onboard SCSI controller. Select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.



Bay	Form Factor	Height	Front Access	Usage
1	133mm (5.25in)	HH	yes	IDE CD-ROM
2	133mm (5.25in)	HH	yes	open[1]
3	89mm (3.5in)	SL	yes	Floppy
4	89mm (3.5in)	SL	yes	open
5 … 7	89mm (3.5in)	SL[2]	yes	open

1. This bay does not support HDD options. It can be used for removable media devices such as tape drives.
2. These bays will be configured as hot-swap bays on models -2AX, -3AX, -4AX and -5AX.

xSeries 220 Internal SCSI Cabling

Non-Hot-Swap Models

xSeries 220 nonhot-swap models are cabled internally with a five-drop, 16-bit wide LVD SCSI cable with a built-in multi-mode active terminator on one end of the cable. The other end of the cable is attached to the internal 68-pin connector of the integrated Ultra160 SCSI controller. SCSI devices can be connected to any of the five cable connectors. If 8-bit (narrow) devices are to be installed, a 68- to 50-pin converter (32G3925) is required for each narrow device.

Hot-Swap Models

xSeries 220 hot-swap models are cabled internally with a two-drop, 16-bit wide LVD SCSI cable. One end is connected to the internal 68-pin connector of the integrated Ultra160 SCSI controller. The first drop is designed to support a SCSI device in the 3.5-inch non-hot-swap bay, while the second drop is connected to the hot-swap SCSI backplane.The SCSI backplane provides termination for the SCSI bus.

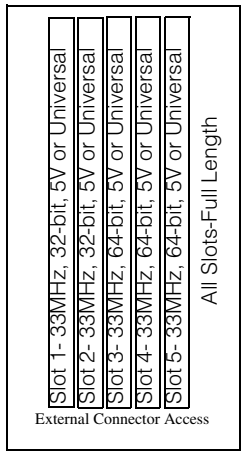
Other Configuration Alternatives

In the case where a RAID controller is used to support internal drives in a xSeries 220, the standard cable is moved from the onboard controller to the RAID adapter. To connect a tape drive to the onboard or other supported SCSI controller, the two-drop cable from Media Bay Tray and LVD Cable Kit (P/N 10K2340) must be used.

External SCSI support can be obtained by installing an optional SCSI adapter or RAID controller and using appropriate external SCSI cabling.

xSeries 220 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]
	Storage Controllers[2]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[3]	Full	32/64-bit	1, 2, 3, 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	32/64-bit	1, 2, 3, 5
19K4646	PCI Wide Ultra160 SCSI Adapter[5]	Half	32-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	1 … 5
	Networking[6]			
	Ethernet			
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter	Half	32-bit	1 … 5
	Communications[7]			
33L4618	PCI V.90 56 Data/Fax Modem	Half	32-bit	1 … 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[8]	Half	32-bit	1 … 5
	Systems Management			
09N7585	Remote Supervisor Adapter	Half	32-bit	2


Slot 1- 33MHz, 32-bit, 5V or Universal
Slot 2- 33MHz, 32-bit, 5V or Universal
Slot 3- 33MHz, 64-bit, 5V or Universal
Slot 4- 33MHz, 64-bit, 5V or Universal
Slot 5- 33MHz, 64-bit, 5V or Universal
All Slots-Full Length
External Connector Access

1. The xSeries 220 has five full-length, 33MHz PCI expansion slots, three 64-bit and two 32-bit.
2. xSeries 220 has an integrated Ultra160 SCSI Controller with a single internal channel and includes a five-drop, multi-mode terminated LVD SCSI cable.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
6. The xSeries 220 includes an integrated full-duplex, 10/100Mbps Ethernet controller. "Wake on LAN™" support is provided for slot one only.
7. xSeries 220 includes two USB ports, two high-speed serial/asynchronous ports, (NS16550A software compatible) and one high-speed parallel port supporting devices using SSP/EPP/ECP protocols adhering to the IEEE 1284 Standard.
8. See Appendix E for details on Serial I/O Options and configuration limitations.

xSeries 220 Power, Monitor & Accessories

Part Number	Description
	Power[1]
	Free Standing Uninterruptible Power Supply (UPS)[2]
94G3134	APC Smart-UPS 700
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
	Rack Mount Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), stealth black[7]
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II

1. The xSeries 220 includes a 330W voltage sensing power supply and a single line cord.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. The xSeries 220 includes an integrated SVGA controller (S3 Savage4 Chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
	Conversion Kits
09N4300	4Ux20D Tower-to-Rack Kit
	Rack and NetBAY[1]
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (Perforated Doors)
36L9703	Netfinity Rack Extension Kit
9306200	Netfinity NetBAY22
36L9702	NetBAY22 Rack Extension Kit
	Keyboard and Mouse[2]
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
28L3673	Sleek 2-button Stealth Black Mouse

1 Rack installation of an xSeries 220 requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) and one of the racks listed here. See IBM Netfinity Rack Cabinet and Options section for IBM rack supported devices.
2. The xSeries 220 includes both a mouse and nonspace saver keyboard.
3. Installation within a rack requires optional keyboard tray(P/N 28L4707) (stows in "ready-to-use" position).
4. Advanced TrackPoint IV features are not available on IBM Netfinity systems.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 220 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures[1]
09N4041	12/24GB DDS/3 4-mm Internal SCSI Tape Drive[2, 3]	2	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3510020, 3551001
09N4042	10/20GB NS Internal SCSI Tape Drive[2, 3]	2, 4	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020, 3551001
00N7991	20/40GB DDS/4 4-mm Internal Tape Drive[3]	2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[4], 3551001[5]
00N8016	100/200GB LTO Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[5]
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[6]	-	8, 16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[7]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[8]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	External	Y	N	3510020
10K2340	Media Bay Tray and LVD Cable Kit[3, 5]	-	16 LVD	Internal	Y	N	3551001

Note: All models include an Ultra160 SCSI controller with a five-drop multi-mode terminated LVD SCSI cable. Single-ended devices attached to this cable will limit the entire SCSI bus to single-ended performance. All tape drives and external tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode terminated LVD SCSI cable and an external 0.8-mm VHDCI connector.

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section, and the desired enclosure, then refer to Appendix D: Cables - Storage Units - Controllers.
2.This single-ended device will limit the SCSI bus to which it is attached to Ultra SCSI speeds. To provide a dedicated tape SCSI bus, install PCI Wide ultra160 SCSI Adapter (P/N 19K4646) which includes a five-drop multi-mode LVD SCSI cable.
3. RAID configurations, where the standard SCSI cable is attached to a RAID adapter, require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340) for attachment of the tape drive to the standard SCSI controller.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956)
5. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
6. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes

xSeries 220 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8645-3AX	x220 866MHz/256KB, 128MB ECC, OPEN-HS, 48X, PCI	1
33L3142	128MB 133MHz SDRAM ECC RDIMM	1[1]
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	2[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.
2. For a total of 36.4GB of internal storage.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to just one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 200 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

File and Print Server

Part Number	Description	Quantity
8645-2AX	x220 800MHz/256KB, 128MB ECC, OPEN-HS, 48X, PCI	1
33L3142	128MB 133MHz SDRAM ECC RDIMM	1[1]
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 256MB of system memory.
2. For a total of 54.6GB of internal storage.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 220 with 256MB of memory and 54.6GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough hard disk drive space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

Application Server

Part Number	Description	Quantity
8645-42X	x220 933MHz/256KB, 128MB ECC, 18.2GB, 48X, PCI	1
10K3819	Netfinity 933MHz with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Upgrade Processor	1
33L3144	256MB 133MHz SDRAM ECC RDIMM	1[1]
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1
00N8205	18.2GB 7200rpm Ultra160 SCSI HDD	2[2]
10K2340	Media Bay Tray and LVD Cable Kit[3]	1
00N7991	20/40GB DDS/4 4mm Internal Tape Drive NS Internal SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3134	APC Smart-UPS 700	1

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB
3. Cable for dedicated attachment of tape to standard controller.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 220 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

IBM xSeries 230 and Netfinity 5100

Part Number	Withdrawal Date[7]	Processor Speed (MHz)[5]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)[2]	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)[3]	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail) Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[4]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 230 / Netfinity 5100 At-A-Glance																
8658-21Y	27-Mar	733	1/2	256	128MB(R)/4GB	Tower	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-2RY[1]	-	733	1/2	256	128MB(R)/4GB	Rack (5U)	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-41Y	-	866	1/2	256	128MB(R)/4GB	Tower	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-4RY[1]	-	866	1/2	256	128MB(R)/4GB	Rack (5U)	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-51Y	-	933	1/2	256	128MB(R)/4GB	Tower	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-5RY[1]	-	933	1/2	256	128MB(R)/4GB	Rack (5U)	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-61Y[6]	-	1GHz	1/2	256	128MB(R)/4GB	Tower	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5
8658-6RY[1, 6]	-	1GHz	1/2	256	128MB(R)/4GB	Rack (5U)	1/3	O - Power S - HDD	O - Power	Y	10/100	D,U160	4/2	0/ 218.4GB	40X-17X	10/8	5/5

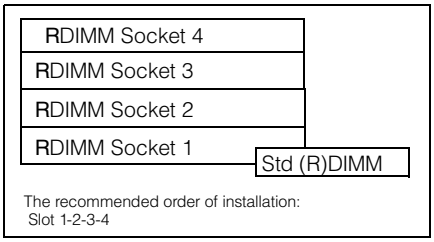
1. Housed in a 19in rack mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "Power, Monitor & Accessories" for supported IBM racks.
2. High-speed, 133MHz SDRAM.
3. Up to two additional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760) and a single Hot-Swap Power Supply Expansion Kit (P/N 37L6881) are required for power supply redundancy. See xSeries 230 / Netfinity 5100 Power, Monitor & Accessories for additional information.
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. Intel Pentium III processor with advanced transfer (full-speed) L2 cache and 133MHz Front-Side Bus.
6. This model is an IBM xSeries 230.
7. Not available from IBM after this date. Business Partner inventory may be available.

xSeries 230 / Netfinity 5100 Processors

Part Number	Processor Upgrades with 256 KB Cache (Full Speed)	SMP Support[1]	Processor Speed Upgrade[2]
19K4630	Netfinity 866MHz 133 FSB/256KB Upgrade with Pentium III Processor	4xY	1 … 3xY
19K4631	Netfinity 933MHz 133 FSB/256KB Upgrade with Pentium III Processor	5xY[3]	-
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	6xY	5xY

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".
3. Netfinity 933MHz Upgrade Processor (P/N 19K4631) is only supported on 8658-5xY models due to thermal restrictions.

xSeries 230 / Netfinity 5100 Memory



The recommended order of installation:
Slot 1-2-3-4

Part Number	Memory Description[1]
33L3123	128MB 133MHz SDRAM ECC RDIMM II
33L3125	256MB 133MHz SDRAM ECC RDIMM II
33L3127	512MB 133MHz SDRAM ECC RDIMM II
33L3129	1GB 133MHz SDRAM ECC RDIMM II

1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

Total Memory[1]	Quantity of RDIMMs Added			
128MB (1 x 128) Models	128MB (33L3123)	256MB (33L3125)	512MB (33L3127)	1GB (33L3129)
256MB	1	-	-	-
384MB	2 or	1	-	-
512MB	3	-	-	-
640MB	-	2 or	1	-
896MB	-	3	-	-
1024MB	-	4[2]	-	-
1152MB	-	-	2 or	1
1664MB	-	-	3	-
2048MB	-	-	4[2]	-
2176MB	-	-	-	2
3200MB	-	-	-	3
4096MB (max)	-	-	-	4[2]

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

xSeries 230 / Netfinity 5100 Hard Disk Drive (HDD) and External Storage

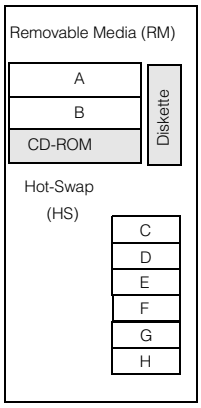
Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4	2	1	4	2	1	4	2
45.5GB	5	-	-	5	-	-	5	-
54.6GB	6	3	-	6	3	-	6	3
72.8GB	-	4	2	-	4	2	-	4
91GB	-	5	-	-	5	-	-	5
109.2GB	-	6	3	-	6	3	-	6
145.6GB	-	-	4	-	-	4	-	-
182GB	-	-	5	-	-	5	-	-
218.4GB (max)	-	-	6	-	-	6	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

Bay	Form Factor	Height	Front Access	Usage
A	133mm (5.25in)	HH[1]	Yes	Open
B	133mm (5.25in)	HH[1]	Yes	Open
-	133mm (5.25in)	SL	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
C … H	HS	SL[2]	Yes	Open

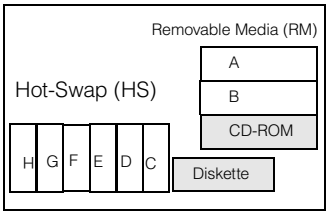
1. Two half-high (HH) bays can be combined to support a single full-high (FH) device. Installation of devices in Bays A or B may require Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one Netfinity 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Installation of HDDs in Bays A and B also requires Media Bay Tray and LVD Cable Kit (P/N 10K2340).
2. Two slim-line (SL) bays (C/D, E/F, G/H) can be combined to support a single half-high (HH) device.

Tower Model View



For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

Rack Model View



Part Number	Description	RPM	Height	Bays Supported	Max Qty
Hot-Swap Ultra160 HDDs					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
37L7206	36.4GB 10-K Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
19K0656	8.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	C … H	6
Associated Options					
10K2340	Media Bay Tray and LVD Cable Kit[1]	-	-	A+B	1
33L3760	250W Hot-Swap Redundant Power Supply	-	-	-	-
37L6881	Hot-Swap Power Supply Upgrade Kit[2]	-	-	-	-

External Storage Expansion Units[3]		Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. Media Bay Tray and LVD Cable Kit (P/N 10K2340) contains a two-drop terminated LVD SCSI cable and the hardware required to convert two half-high 5.25in removable media bays into two nonhot-swap 7200RPM HDD bays.
2. Hot-Swap Power Supply Upgrade Kit (37L6881) contains a hot-swap power backplane that supports installation for up to three hot-swap power supplies.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

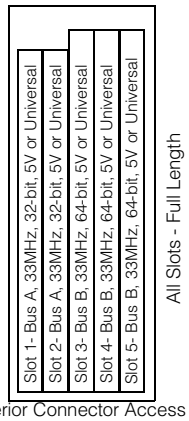
xSeries 230 / Netfinity 5100 Internal SCSI Cabling

The xSeries 230 and Netfinity 5100 contain a DASD backplane supporting six hot-swap, SCA-2 compliant drive bays. The backplane is connected to channel A of the integrated dual-channel, Ultra160 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. No external SCSI port is included.

A two-drop, 16-bit LVD SCSI cable with integrated terminator is also included with the Netfinity Hot-Swap Power Supply Expansion Kit (P/N 37L6881).This cable is included in the expansion kit because installation of SCSI devices in bays A and B requires additional power. The two-drop cable supports up to two internal devices in these bays. This cable can be attached to channel B of the integrated dual-channel Ultra160 SCSI controller or to a supported SCSI adapter.

xSeries 230 / Netfinity 5100 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported
	Storage Controllers[1]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[2]	Full	32/64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[3]	Full	32/64-bit	1 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[5]	Half	32/64-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	1 … 5
	Fibre Storage Controllers and Options[6]			
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 …5
35521RU	FAStT500 Storage Server	-	-	-
35421RU	FAStT200 Storage Server	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[7]	-	-	-
	Networking[8]			
	Ethernet			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[9]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[9]	Half	32-bit	1 … 5
	Communications[10]			
33L4618	PCI V90 56 Data/Fax Modem[11]	Half	32-bit	1 … 5
37L14xx	Serial I/O SST 8, 16 and 128 port adapters[12]	Half	32-bit	1 … 5
	Systems Management[13]			
01K7209	Netfinity Advanced System Management PCI Adapter[14]	Full	32-bit	1 … 5 [15]
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[16]	-	-	-
36L9654	Netfinity Advanced System Management Token-Ring Connection[17]	-	-	-
	Host Attach			
9086001	Netfinity ESCON Adapter[18]	Full	32-bit	1 … 5[19]


Slot 1- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 2- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 3- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 4- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 5- Bus B, 33MHz, 64-bit, 5V or Universal
All Slots - Full Length
Exterior Connector Access

1. xSeries 230 / Netfinity 5100 includes a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI .
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.

6. See Netfinity Fibre Array Solutions section for additional configuration information.
7. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
8. xSeries 230 / Netfinity 5100 includes a full-duplex, 10/100Mbps Ethernet PCI controller.
9. The Wake on LAN function of this option is not supported by this server.
10. xSeries 230 / Netfinity 5100 includes two USB ports, two serial and one parallel port.
11. Due to homologation variances, modem availability may differ by country.
12 See Appendix E for details on Serial I/O Options and configuration limitations.
13. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 230 / Netfinity 5100 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
14. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
15. A maximum quantity of one is supported.
16. Required for all xSeries / Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
17 Contains an IBM Turbo 16/4 Token-Ring PCI card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to nine-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware access www.pc.ibm.com/us/netfinity. Select "Server Support," "Family," "Model," "Downloadable files" and finally "Advanced Systems Management."
18. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
19. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

xSeries 230 / Netfinity 5100 Power, Monitor & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply[2]
37L6881	Hot-Swap Power Supply Expansion Kit[3]
	Uninterruptible Power Supply (UPS)[4]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[5]
94G6676	APC Smart-UPS 3000RMB[5]
37L6861	APC Smart-UPS 5000RMB[6]
	Monitors[7]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[8]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[8]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[8]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[9]

1. xSeries 230 / Netfinity 5100 include single 250W, hot-swap power supply and a single 9ft 110V power cord with an IEC 320-C13 connector on the system end and NEMA 5-15P on the other end. Power supply redundancy may be achieved with the addition of optional 250W Hot-Swap Redundant Supply (P/N 33L3760). Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) is required when optional power supplies are to be added. Redundancy for configurations of greater than 250W requires installation of a second optional supply. Additional power may be required when installing a SCSI device in bay A or B. Configurations exceeding four SL hot-swap hard disk drives and two PCI adapters require both Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). An optional SCSI cable is required for attachment of media bay devices to Ultra160 controller B. No external SCSI port is available. External tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature.
2. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a single 6ft power cord for connection to a low voltage wall outlet. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) must be installed prior to adding optional power supplies.
3. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane, terminated two-drop LVD SCSI cable, and mounting brackets for DLT tape drives. Required when installing a second power supply or devices in the 133mm (5.25in) HH bays.
4. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
5. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
6. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
7. Netfinity 5100 uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
8. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
9. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
Conversion Kits	
37L6858	5Ux24D Tower-to-Rack Kit
Rack and NetBAY[1]	
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 230 / Netfinity 5100 rack models are housed in a 19in rack mountable drawer and require one of the racks listed here. See Rack Cabinet and Options section for IBM rack supported devices.
2. Tower models include both a keyboard and mouse. Rack models include neither.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

xSeries 230 / Netfinity 5100 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive[1]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[3], 3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	A+B	8	133mm (5.25in) FH	N	Y	3503B0X[3], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[3], 3551001[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[1]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[3], 3551001[2]
00N8016	100/200GB LTO Tape Drive[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
Tape Autoloaders							
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader[1]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N	3551001[2]
External Tape Libraries[4]							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
External Tape Enclosures							
3510020	External Half High SCSI Storage Enclosure[5]	-	8/16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[6]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[7]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[8]	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1, 2]	-	16 LVD	Int	Y	N	3551001
37L6881	Netfinity Hot-Swap Power Supply Expansion Kit[9]	-	16 LVD	Int	Y	N	-
33L3760	250W Hot-Swap Redundant Power Supply	-	-	-	-	-	-

Note: Additional power may be required when installing a SCSI device in bay A or B. Configurations exceeding four SL hot-swap hard disk drives and two PCI adapters require both Hot-Swap Power Supply Expansion Kit (P/N 37L6881) and at least one optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). An optional SCSI cable is required for attachment of media bay devices to Ultra160 controller B. No external SCSI port is available. External tape enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. Internal tape drives require the two-drop multi-mode terminated LVD SCSI cable included with either Media Bay Tray and LVD Cable Kit (P/N 10K2340) or Hot-Swap Power Supply Expansion Kit (P/N 37L6881).
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
6. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
9. Hot-Swap Power Supply Expansion Kit (P/N 37L6881) includes a hot-swap power backplane and two-drop multi-mode terminated LVD SCSI cable. Required when installing a second power supply.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 230 / Netfinity 5100 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8658-51Y	Netfinity 5100 933MHz/256KB, 128MB ECC, OPEN, 40X, PCI	1
33L3123	128MB 133MHz SDRAM ECC RDIMM II	1[1]
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	4[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3135	APC Smart-UPS 1000	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
33L3760	250W Hot-Swap Redundant Power Supply	1

1. For a total of 256MB of system memory.
2. Three HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 18.2GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the Netfinity 5100 was selected to provide an affordable price point for the growing Internet server market, 256MB of system memory (expandable to 4GB, and availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

File and Print Server

Part Number	Description	Quantity
8658-61Y	xSeries 230 1GHz/256KB, 128MB ECC, OPEN, 40X, PCI	1
33L3123	128MB 133MHz SDRAM ECC RDIMM II	1[1]
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G3135	APC Smart-UPS 1000	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
33L3760	250W Hot-Swap Redundant Power Supply	1

1. For a total of 256MB of system memory.
2. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is three HDDs or 27.3GB.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 230 with 256MB of memory (expandable to 4GB) and 27.3GB of RAID-protected HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

The configuration also includes a tape backup unit, monitor, and a UPS to keep the system protected during power surges and outages.

Rack Mounted Application Server

Part Number	Description	Quantity
8658-5RY	Netfinity 5100 933MHz/256KB, 128MB ECC, OPEN, 40X, PCI (Rack 5U)	1
19K4631	933MHz 133 FSB/256KB Upgrade with Pentium III Processor	1
33L3125	256MB 133MHz SDRAM ECC RDIMM II	1[1]
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	5[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
33L3760	250W Hot-Swap Redundant Power Supply	1
37L6881	Hot-Swap Power Supply Expansion Kit	1
	Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)	
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 384MB of system memory.
2. Five HDDs are used for RAID 5 protection. Effective capacity is four HDDs or 36.4GB.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the Netfinity 5100 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as battery-backed cache, RAID protected internal hot-swap storage and power protection with an APC Smart-UPS.

xSeries 230 High Availability Cluster (P/N 25P1821 and 25P1822)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.

IBM xSeries 240 and Netfinity 5600

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 240 / Netfinity 5600 At-A-Glance																
8664-61Y	866	1/2	256	256MB(R)/4GB[3]	Tower	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5
8664-6RY[1]	866	1/2	256	256MB(R)/4GB[3]	Rack (5U)	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5
8664-71Y	933	1/2	256	256MB(R)/4GB[3]	Tower	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5
8664-7RY[1]	933	1/2	256	256MB(R)/4GB[3]	Rack (5U)	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5
8664-81Y[6]	1GHz	1/2	256	256MB(R)/4GB[3]	Tower	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5
8664-8RY[1, 6]	1GHz	1/2	256	256MB(R)/4GB[3]	Rack (5U)	2/3	P, S,H,F	S-Power[4] S-Fans	Y	10/100	D,U2	4/2	0/218GB	40X-17X[5]	10/8	5/5

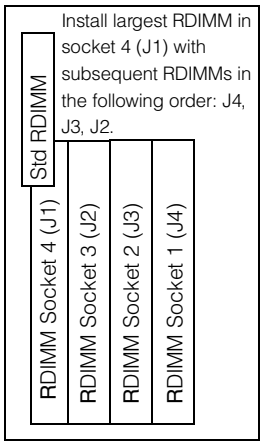
1. Housed in a 19in Rack mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 133MHz Front-Side Bus.
3. High-speed 133MHz SDRAM.
4. Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under "Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. This model is an IBM xSeries 240.

xSeries 240 / Netfinity 5600 Processors

Part Number	Processor Upgrades with 256KB Cache (Full Speed)	SMP Support[1]	Processor Speed Upgrade[2]
19K4630	Netfinity 866MHz 133 FSB/256KB Upgrade with Pentium III Processor	6xY	1 … 5xY
19K4631	Netfinity 933MHz 133 FSB/256KB Upgrade with Pentium III Processor	7xY	1 … 6xY
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	8xY	-

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS".

xSeries 240 / Netfinity 5600 Memory


Install largest RDIMM in socket 4 (J1) with subsequent RDIMMs in the following order: J4, J3, J2.
Std RDIMM
RDIMM Socket 4 (J1)
RDIMM Socket 3 (J2)
RDIMM Socket 2 (J3)
RDIMM Socket 1 (J4)

Total Memory[1]	Quantity of RDIMMs Added			
256MB (1 x 256) Models	128MB (33L3058)	256MB (33L3060)	512MB (33L3062)	1GB (33L3064)
384MB	1	-	-	-
512MB	2 or	1	-	-
640MB	3	-	-	-
768MB	-	2 or	1	-
1024MB	-	3	-	-
1280MB	-	-	2 or	1
1792MB	-	-	3	-
2048MB	-	-	4[2]	-
2304MB	-	-	-	2
3328MB	-	-	-	3
4096MB (max)	-	-	-	4[2]

This table does not represent all possible memory configurations.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

Part Number	Memory Description[1]
33L3058	128MB, 133MHz SDRAM ECC RDIMM
33L3060	256MB, 133MHz SDRAM ECC RDIMM
33L3062	512MB, 133MHz SDRAM ECC RDIMM
33L3064	1GB, 133MHz SDRAM ECC RDIMM

1. Install largest RDIMM in socket 4 (J1) with subsequent RDIMMs in the following order: J4, J3, J2.

xSeries 240 / Netfinity 5600 Hard Disk Drive (HDD) and External Storage

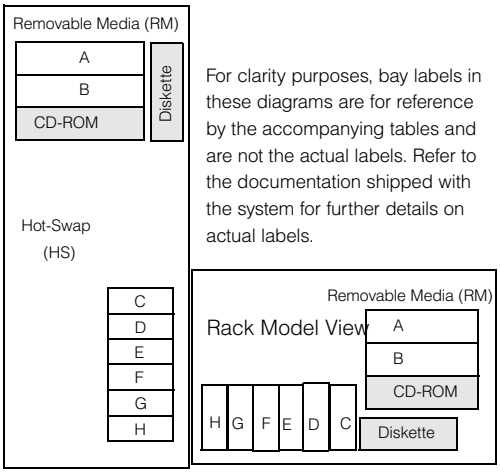
Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)[2]	18.2GB (37L7202)[2]	36.4GB (37L7203)[2]	9.1GB (37L7204)[2]	18.2GB (37L7205)[2]	36.4GB (37L7206)[2]	9.1GB (19K0655)[2]	18.2GB (19K0656)[2]
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4	2	1	4	2	1	4	2
45.5GB	5	-	-	5	-	-	5	-
54.6GB	6	3	-	6	3	-	6	3
72.8GB	-	4	2	-	4	2	-	4
91GB	-	5	-	-	5	-	-	5
109.2GB	-	6	3	-	6	3	-	6
145.6GB	-	-	4	-	-	4	-	-
182GB	-	-	5	-	-	5	-	-
218.4GB (max)	-	-	6	-	-	6	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Netfinity 5600 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

Bay	Form Factor	Height	Front Access	Usage
A	133mm (5.25in)	HH[1]	Yes	Open
B	133mm (5.25in)	HH[1]	Yes	Open
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
C … H	HS	SL[2]	Yes	Open

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
2. Two slim-line (SL) bays can be combined to support a single half-high (HH) device.

Tower Model



For clarity purposes, bay labels in these diagrams are for reference by the accompanying tables and are not the actual labels. Refer to the documentation shipped with the system for further details on actual labels.

P / N	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 Hard Disk Drives (HDD)[1]					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	C … H	6
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
37L7206	36.4GB 10-K Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	C … H	6
19K0655	9.1GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	C … H	6
19K0656	18.2GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	C … H	6
Associated Options					
10K2340	Media Bay Tray and LVD Cable Kit[2]	-	-	A+B	1

	Ext Storage Expansion Units[3]	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 240 / Netfinity 5600 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Media Bay Tray and LVD Cable Kit (P/N 10K2340) contains a two-drop terminated LVD SCSI cable and the hardware required to convert two half-high 5.25in removable media bays into two nonhot-swap 7200RPM HDD bays.
3. Not supported by the onboard external SCSI port. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 240 / Netfinity 5600 Internal SCSI Cabling

The xSeries 240 and Netfinity 5600 contain a backplane supporting six hot-swap drive bays. The backplane is connected to the integrated dual channel, wide Ultra2 SCSI controller connector through a 16-bit LVD SCSI cable. If internal RAID support is required, this cable can be used to connect to a supported RAID adapter rather than the integrated SCSI controller. A two-drop, 16-bit SCSI cable with integrated terminator is also included with the server to support up to two internal removable media devices. This cable can be attached to the integrated SCSI controller if a RAID adapter is used to support the internal hot-swap drive bays. It can also be used to attach to a supported SCSI adapter if the integrated Ultra2 SCSI controller is utilized for the hot-swap bays. The second channel is available through an industry-standard 0.8mm Very High Density Connector Interface (VHDCI) located on the rear panel for external use.

xSeries 240 / Netfinity 5600 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported	Hot-Plug[2]
	Storage Controllers[1]				
37L6091	ServeRAID-4L Ultra160 SCSI Controller[3]	Full	32/64-bit	1 … 5	X
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 5	X
37L6889	ServeRAID-4H Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 5	X
19K4646	PCI Wide Ultra160 SCSI Adapter[6]	Half	32/64-bit	1 … 5	-
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	1 … 5	-
	Fibre Storage Controllers and Options[7]				
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 5	X
35521RU	FAStT500 Storage Server	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port[8]	-	-	-	-
	Networking[9]				
	Ethernet				
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5	X
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 5	X
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5	X
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 5	X
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5	X
	Token Ring				
34L5001	16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1 … 5	X
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1 … 5	X
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[10]	Half	32-bit	1 … 5	X
	Communications[11]				
33L4618	PCI V.90 56K Data/Fax Modem[12]	Half	32-bit	1 … 5	-
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[13]	Half	32-bit	1 … 5[13]	-
	Systems Management[14]				
01K7209	Netfinity Advanced System Management PCI Adapter[15]	Full	32-bit	1 … 5[16]	-
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[17]	-	-	-	-
36L9654	Netfinity Advanced System Management Token-RIng Connection[18]	-	-	-	-
	Host Attach				
9086001	Netfinity ESCON Adapter[19]	Full	32-bit	1 … 5[20]	-

Rack Model

Slot 5- PCI, Hot-Plug, 32/64-bit, Full Length	Slot 4- PCI, Hot-Plug, 32/64-bit, Full Length	Slot 3- PCI, Hot-Plug, 32/64-bit, Full Length	Slot 2- PCI, 32-bit, Full Length	Slot 1- PCI, 32-bit, Full Length

1. xSeries 240 / Netfinity 5600 has two integrated Wide Ultra2 SCSI channels. One is internal and the other is external with a 0.8mm Very High Density Connection Interface (VHDCI).
2. Three of the five PCI slots are 32/64-bit Hot-Plug capable using IBM's Active™ PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
3. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connectors are 0.8mm VHDCI.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
6. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
7. See Netfinity Fibre Array Solutions section for additional configuration information.
8. The 2108R3L SAN Data Gateway Router UltraSCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
9. xSeries 240 / Netfinity 5600 has an integrated 10/100 PCI Ethernet Controller.
10. The Wake on LAN function of this option is not supported by this server.
!1. xSeries 240 / Netfinity 5600 includes two USB ports, three high-speed serial/asynchronous ports (two NS16550A compatible, one for the Advanced System Management Processor) and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE1284 standard.
12. Due to homologation variances, modem availability may differ by country.

13. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
14. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 240 / Netfinity 5600 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309), additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
15. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter that requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
16. A maximum quantity of one is supported.
17. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
18. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter (P/N 01K7209), and a PC Card to 9-pin D-Shell cable, which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.
19. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
20. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

xSeries 240 / Netfinity 5600 Power, Monitor & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1. xSeries 240 / Netfinity 5600 include two 250W hot-swap power supplies, each with its own power cord. These standard power supplies are sufficient to operate fully configured systems; however, optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) is required to preserve redundancy if any of the following are exceeded:

Single Processor Configuration
- Six SL HDDs and two PCI adapters
  (1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

E.g., to preserve power supply redundancy with three PCI adapters, only four SL HDDs can be installed before an optional power supply is required.

Dual Processor Configuration
- Four SL HDDs and two PCI adapters
  (1 HH HDD = 2 SL, 1 tape = 2 SL, 1 PCI adapter = 2 SL)

A "nonredundant" LED on the system unit will indicate when 250W has been exceeded. 250W Hot-Swap Redundant Power Supply (P/N 33L3760) includes a power cord which requires an additional power source. An independent power source such as a second UPS or second circuit is not required.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 240 / Netfinity 5600 use an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
Conversion Kits	
37L6858	5Ux24D Tower-to-Rack Kit
Rack and NetBAY[1]	
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4,5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 240 / Netfinity 5600 rack models are housed in a 19in rack mountable drawer and require one of the racks listed here. See IBM Netfinity Rack Cabinet and Options section for IBM rack supported devices.
2. Tower models include both a mouse and a keyboard. Rack models include neither.
3. Installation within a rack requires optional keyboard tray(P/N 28L4707) (stows in ready-to-use position).
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

xSeries 240 / Netfinity 5600 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
09N4042	10/20GB NS Internal SCSI Tape Drive[1]	A, B	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3510020
00N7991	20/40GB DDS/4 4mm Internal Tape Drive[2]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[4], 3551001[3]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	A+B	8	133mm (5.25in) FH	N	Y	3503B0X[4], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[4], 3551001[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[4], 3551001[3]
00N8016	100/200GB LTO Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[3]
Tape Autoloaders							
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	-	-
00N7992	120/240GB DDS/4 Tape Autoloader[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[3]
External Tape Libraries[5]							
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
External Tape Enclosures							
3510020	External Half-High SCSI Storage Enclosure[6]	-	8/16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[7]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[8]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[9]	-	16 LVD	-	N	N	3551001
Associated Options							
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[2, 3]	-	16 LVD	Int	Y	N	3551001

Note: Netfinity 5600 includes a wide two-drop single-ended terminated cable which can be used for attachment of internal tape drives to the onboard Ultra2 controller when the hot-swap backplane is attached to a RAID controller. If LVD support is required, an optional LVD cable must be ordered. An external Ultra2 SCSI port is available with a 0.8mm VHDCI connector. External tape enclosures are supported by the standard external SCSI port or PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. Non-RAID Configurations: Requires PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which contains a five-drop multi-mode terminated LVD SCSI cable.
2. RAID configurations: Configurations where the hot-swap backplane is cabled to a RAID controller, require the two-drop multi-mode terminated LVD SCSI cable included with Media Bay Tray and LVD Cable Kit (P/N 10K2340) for support of LVD devices in LVD mode. Use of the included single-ended terminated cable with an LVD device will be limited to single-ended SCSI rules.
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
5. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
6. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
7. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
8. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
9. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 240 / Netfinity 5600 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability Application Server

Part Number	Description	Quantity	Usage
8664-71Y	Netfinity 5600 933MHz/256KB, 256MB ECC, Open, 40X, PCI	1	-
33L3060	256MB, 133MHz SDRAM ECC RDIMM	1	512MB total system memory
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	4[1]	-
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1	-
10K2340	Media Bay Tray and LVD Cable Kit	1	-
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1	RAID 5
33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1	
94G3135	APC Smart-UPS 1000	1	UPS

1. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 54.6GB

This tower server is configured to act as the foundation for business critical applications your business cannot afford to be without. Configured with enough HDD storage to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

High Availability File Server

Part Number	Description	Quantity	Usage
8664-81Y	xSeries 240 1GHz/256KB, 256MB ECC, Open, 40X, PCI	1	-
37L7204	9.1GB 10K-4 Ultra2 SCSI Hot-Swap SL HDD	6[1]	-
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1	-
10K2340	Media Bay Tray and LVD Cable Kit	1	-
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID 5 array, with hot-spare
33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1	-
94G3135	APC Smart-UPS 1000	1	-

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 36.4GB

This tower model is configured to meet the need of server consolidation. Many businesses are trying to get their arms around the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers onto one platform there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries240 is designed for high availability. This configuration includes RAID-protected internal storage, a third power supply which provides fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 40GB per tape in addition to all the standard features of the xSeries 240.

IBM xSeries 250

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache	Memory (Std/Max) (R = RDIMM)[3]	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
8665-61Y	700	1/4	1MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6
8665-6RY[1]	700	1/4	1MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6
8665-71Y	700	1/4	2MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6
8665-7RY[1]	700	1/4	2MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6
8665-81Y	900	1/4	2MB	512MB(R)/16GB	Tower	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6
8665-8RY[1]	900	1/4	2MB	512MB(R)/16GB	Rack (8U)	2/4	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U2	4/2	0/364GB	48X-20[5]	14/12	6/6

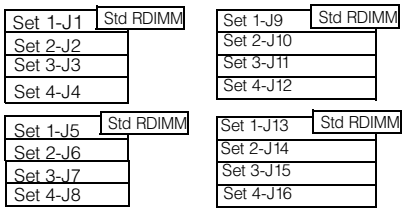
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "xSeries 250 Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III Xeon processor with advanced transfer (full speed) L2 cache and 100MHz access to memory and I/O buses.
3. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
4. Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under Netfinity 7600 Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Netfinity xSeries 250 Processor Upgrades

Part Number	Processor Upgrades with Full Speed Cache	SMP Support[1]	Processor Speed Upgrade[2]
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	61Y, 6RY	-
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	71Y, 7RY	61Y, 6RY
19K4635	xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor	81Y, 8RY	6 ,,, 7xY

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."

Netfinity xSeries 250 Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory[1]	Quantity of RDIMMs Added[2]			
	128MB (33L3113)	256MB (33L3115)	512MB (33L3117)[4]	1GB (33L3119)
512MB	4 x 128 RDIMMs standard	-	-	-
1GB	4	-	-	-
1.5GB	-	4	-	-
2GB	4	4	-	-
2.5GB	-	8	-	-
3GB	4	-	4	-
4GB	4	4	4	-
5GB	4	-	8	-
6GB[3]	-	8	8	-
7GB[3]	-	4	12	-
8GB[3]	-	-	16	-
9GB	4	-	-	8
10GB[3]	-	-	12	4
12GB[3]	-	-	8	8
14GB[3]	-	-	4	12
16GB[3] (max)	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the Quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33l3115.
3. Requires removal of standard RDIMMs.
4. The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

Part Number	Memory Description[1]
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM[2]
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM
33L3147	2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB)[2]

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Memory must be installed in sets of four identical RDIMMs (example: quantity four of 33L3113). Install RDIMM sets in numerical sequence from Set 1 to Set 4. Chipkill support is provided on the memory card.
2. Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117).

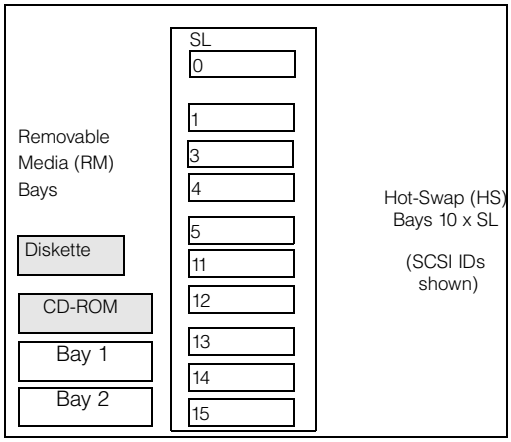
Netfinity xSeries 250 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)[2]	18.2GB (37L7202)[2]	36.4GB (37L7203)[2]	9.1GB (37L7204)[2]	18.2GB (37L7205)[2]	36.4GB (37L7206)[2]	9.1GB (19K0655)[2]	18.2GB (19K0656)[2]
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4	2	1	4	2	1	4	2
45.5GB	5	-	-	5	-	-	5	-
54.6GB	6	3	-	6	3	-	6	3
63.7GB	7	-	-	7	-	-	7	-
72.8GB	8	4	2	8	4	2	8	4
81.9GB	9	-	-	9	-	-	9	-
91GB	10	5	-	10	5	-	10	5
109.2GB	-	6	3	-	6	3	-	6
127.4GB	-	7	-	-	7	-	-	7
145.6GB	-	8	4	-	8	4	-	8
163.8GB	-	9	-	-	9	-	-	9
182GB	-	10	5	-	10	5	-	10
218.4GB	-	-	6	-	-	6	-	-
254.8GB	-	-	7	-	-	7	-	-
291.2GB	-	-	8	-	-	8	-	-
327.6GB	-	-	9	-	-	9	-	-
364GB (max)	-	-	10	-	-	10	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 250 ships standard with an Ultra2 SCSI storage controller. The standard backplane supports Ultra160 HDDs at Ultra2 speeds (80Mbps) when connected to the standard integrated storage controller or at Ultra160 speeds (160Mbps) with the addition of an optional Ultra160 storage controller.

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
RM 1	133mm (5.25in)	HH[1]	Yes	Open
RM 2	133mm (5.25in)	HH[1]	Yes	Open
1 … 10	HS	SL	Yes	Open
NB3[2]	19in Rack	3U	Yes	Open

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
2. Tower configured systems support installation of up to three NetBAY3s. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.



Netfinity NetBAY3 (NB3)
(Optional on Tower Configurations)

All bays are SL. Bus A includes the top five bays supported by the standard integrated Ultra2 SCSI controller connected by a standard 16-bit LVDS cable. Bus B includes the lower five bays. For clarity, the SCSI IDs are identified.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
	Ultra160 HDDs[1]				
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10
	Associated Options				
37L7086	xSeries Ultra160 SCSI Repeater Card[2]	-	-	-	1

	External Storage Expansion Units[2, 3]	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 250 contains an Ultra2 hot-swap, split backplane which supports Ultra160 HDDs at Ultra2 bus speeds when connected to the standard integrated storage controller. Ultra160 bus speeds are supported with the addition of an optional Ultra160 storage controller.
2. xSeries Ultra160 SCSI Repeater Card kit includes a jumper cable and installation hardware. This option is used to convert the standard split backplane into a single SCSI channel supporting up to 10 HDDs.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6.The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

xSeries 250 Internal SCSI Cabling

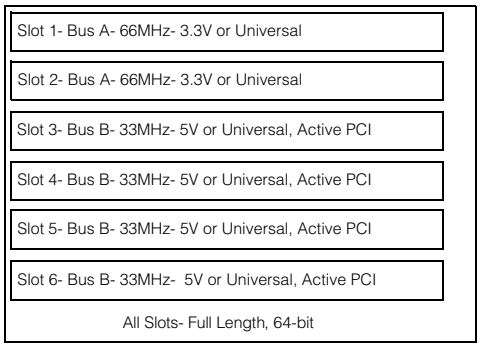
The xSeries 250 contains a hot-swap backplane architected into two backplanes, each containing five drives. This split backplane supports a total of 10 hot-swap SCA-2 compliant drives. One of the backplanes is connected to one of the internal connectors of the standard Ultra2 SCSI controller through a 16-bit LVDS cable. Another 16-bit LVDS cable is connected to the other backplane connector; however, this cable is left disconnected at the other end. The standard configuration allows support of five drives from the standard SCSI controller. If additional drive bays are needed, an optional xSeries Ultra160 SCSI Repeater Card (P/N 37L7086) must be installed to connect both backplanes into a single channel, 10-bay configuration. The repeater card is shipped with a jumper cable and installation hardware. Channel A of the dual-channel, Wide Ultra2 SCSI controller only supports external SCSI attachment and is connected directly to an external 0.8mm VHDCI SCSI connector. To support SCSI devices in the internal 5.25in half-high bays, a two-drop, 16-bit LVD SCSI cable can be used to connect channel B of the integrated Wide Ultra2 SCSI controller to SCSI devices in one or both of the removable media bays when an optional RAID controller is used to support the internal hot-swap drive bays. If the standard SCSI controller is used to support the hot-swap drive bays, then an optional SCSI adapter is required to support installation of devices in these 5.25/3.5in half-high bays. Most configurations for this class of server will generally incorporate an optional ServeRAID-4 Ultra160 SCSI controller to support internal RAID protection. The split backplane of the xSeries 250 is optimized to support a two-channel ServeRAID controller to enhance performance. Each backplane can be cabled to an internal connector of the RAID controller by removing the standard 16-bit LVDS cable from the Ultra2 SCSI controller and attaching it to one of the RAID controller connections. The other standard 16-bit LVDS cable is attached to the remaining internal connector of the RAID controller. In configurations where a single channel RAID array is required, an xSeries Ultra160 SCSI Repeater Card must be installed.

xSeries 250 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6091	ServeRAID-4L Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	32/64-bit	1 … 6[7]	X	Universal	33
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32/64-bit	1 … 6	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	3 … 6	-	5	33
	Fiber Storage Controllers and Options[9]						
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 6	X	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-	-	-	-
	Networking[11]						
	Ethernet						
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 6[7]	X	Universal	33
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 6[7]	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 6[7]	X	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 6[7]	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 6	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12]	Half	32-bit	1 … 6[7]	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X	Universal	33
	Communications[13]						
33L4618	PCI V.90 56 Data/Fax Modem[14]	Half	32-bit	3 … 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters[15]	Half	32-bit	3 … 6	-	5	33
	Systems Management[16]						
01K7209	Netfinity Advanced System Management PCI Adapter[17]	Full	32-bit	3 … 6[20]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[18]	-	-	-	-	-	-
36L9654	Netfinity Advanced System Management Token-RIng Connection[19]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[21]	Full	32-bit	3 … 6[22]	-	5	33

1. The 5V slots support Universal or 5V adapters. The 3.3V slots support universal or 3.3V adapters. A Universal keyed 66MHz adapter plugged into a 33MHz slot will operate at 33MHz. A Universal keyed 33MHz adapter plugged into a 66MHz slot limits other adapters installed on the same bus to 33MHz.
2. Slots three through six include hot-plug capability using IBM's Active PCI technology. For Network Operating System support access www.pc.ibm.com/us/compat.
3. All models include a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller with one internal connector (connected to Channel A of the hot-swap split backplane) and one external port with a 0.8mm Very High Density Connection Interface (VHDCI).
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
7. Installation of a 33MHz adapter into a Bus A 66MHz slot will slow operation of all Bus A slots to 33MHz.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. See Netfinity Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
11. xSeries 250 includes a full-duplex, 10/100Mbps Ethernet PCI Controller.
12. The Wake-on LAN function of this option is not supported by this server.

13. xSeries 250 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A compatible), and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
14. Due to homologation variances, modem availability may differ by country.
15. See Appendix E for details on Serial I/O Options and configuration limitations.
16. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 250 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. Required for all Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection (Netfinity 5500 models 8660-1 … 4xU are not supported). Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
19.Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.pc.ibm.com/us/netfinity. Select "Server Support," "Family," "Model," "Downloadable files," and finally "Advanced Systems Management."
20. A maximum quantity of one is supported.
21. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.


Slot 1- Bus A- 66MHz- 3.3V or Universal
Slot 2- Bus A- 66MHz- 3.3V or Universal
Slot 3- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 4- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 5- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 6- Bus B- 33MHz- 5V or Universal, Active PCI
All Slots- Full Length, 64-bit

xSeries 250 Power, Monitor & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1. xSeries 250 includes two 250W hot-swap redundant power supplies, with the ability to accept one additional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Each power supply includes its own 9ft power cord for attachment to a low voltage UPS, PDU or wall outlet. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the Netfinity 7600. Predicting whether a particular configuration will require an additional power supply for redundancy is very complex. However, once the system is installed, the "Non-Redundant LED" will indicate when an additional power supply is required. The following sample configuration is provided as a reference.

Number of Power Supplies	System Configuration Supported
3[8]	**Typical Redundant Configuration**
	4 x Processors
	6 x PCI Adapters
	10 x Slim-Line HDDs
	16 x 512MB RDIMMs
4	**Full Configuration with Redundancy**

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 250 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. The addition of a DLT tape drive may require a fourth power supply to preserve redundancy.

Part Number	Description
	Conversion Kits
37L6860	8Ux24D Rack-to-Tower Kit[1]
37L6859	8Ux24D Tower-to-Rack Kit
	Rack and NetBAY[2]
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
10L6912	Netfinity NetBAY3[3]
	Keyboard and Mouse[4]
28L3644	Space Saver II Keyboard[5, 7]
01K1260	TrackPoint IV 104-Key Black Keyboard[6,7]
28L3621	Preferred Keyboard (stealth black)[6]
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3 with casters.
2. xSeries 250 rack models are housed in a 19in rack mountable drawer. See Rack Cabinet and Options section for IBM rack supported devices.
3. xSeries 250 rack models require 8Ux24D Rack-to-Tower Kit (P/N 37L6860) for use with a NetBAY3. A maximum of three NetBAY3 enclosures, including the one which ships with the conversion kit, may be stacked beneath a supported Netfinity tower server. Optional NetBAY3s must be shipped separately and not while attached to the base configuration. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.
4. xSeries 250 rack models ship without a keyboard or mouse.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
6. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
7. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

xSeries 250 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1, 2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
00N7990	40/80GB DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[2], 3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	1+2	8	133mm (5.25in) FH	N	Y	3503B0X[2] 3551001
00N8016	100/200GB LTO Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[1]
	Tape Autoloaders						
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	N/A	-
00N7992	120/240GB DOS/4 Tape Autoloader	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
	External Tape Libraries[3]						
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[4]	-	8, 16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[5]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[6]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[7]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1]	-	16 LVD	Int	Y	N	3551001

Note: xSeries 250 includes a two-drop multimode terminated LVD SCSI cable, an available internal Ultra2 SCSI port and an external Ultra2 0.8mm VHDCI connector.

1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
5. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 250 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability Application Server

Part Number	Description	Quantity	Usage
8665-7RY	xSeries 250 Pentium III Xeon 700/2MB, 512MB(R) ECC, OPEN, 40X, PCI (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	-
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4	-
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM	4	4GB Total System Memory
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	3	Total of 4 SMP processors
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1	Optional RAID adapter
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	6[1]	72GB RAID 5 with Hot-Spare
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
33L3760	250W Hot-Swap Redundant Power Supply	1	Full Power Redundancy
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	
28L3644	Space Saver II Keyboard	1	-
94G6674	APC Smart-UPS 1400RMB	1	-
External Storage			
35311RU	EXP300 Storage Expansion Unit	1	Includes 2M Ultra2 cable
37L7206	36.4GB 10K-4 Wide Ultra160 SCSI Hot-Swap SL HDD	14	RAID 5 Data Storage with Hot-Spare
Rack			
9306200	Netfinity NetBAY22	1	
09N4290	NetBAY 1x4 Console Switch	1	
94G6667	Power Cable - Type A14	1	
94G7447	NetBAY Console Cable Set-12ft	1	
94G6670	Blank Filler Panel Kit	1	

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB

This rack server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. Configured with enough HDDs to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

Server Consolidation

Part Number	Description	Quantity	Usage
8665-6RY	xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X, PCI (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	1GB Total System Memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1	Optional RAID adapter
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB RAID 5 with Hot-Spare
06P3601	10/100 Ethernet Server Adapter	3	Total of 4 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	
28L3644	Space Saver II Keyboard	1	-
94G6674	APC Smart-UPS 1400RMB	1	-
Rack			
9306200	Netfinity NetBAY22	1	-
09N4290	NetBAY 1x4 Console Switch	1	-
94G6667	Power Cable - Type A14	1	Attaches to monitor
94G7447	NetBAYConsole Cable Set 12ft	1	-
94G6670	Blank Filler Panel Kit	2	-

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This rack server is configured to meet the need of server consolidation. Many businesses are trying to achieve better control of the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers on to one platform, there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the xSeries 250 is designed for high availability. This configuration includes 109GB of internal HDD storage, features three power supplies which provide fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 80GB per tape--in addition to all the standard features of the Netfinity 7600.

High Availability File and Print Server

Part Number	Description	Quantity	Usage
8665-61Y	xSeries 250 Pentium III Xeon 700/1MB, 512MB(R) ECC, OPEN, 40X, PCI (Tower)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	1GB Total System Memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1	Optional RAID adapter
37L7086	xSeries Ultra160 SCSI Repeater Card	1	Create single SCSI bus from split backplane
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB RAID 5 with Hot-Spare
06P3601	10/100 Ethernet Server Adapter	3	Total of 4 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	-
94G3136	APC Smart-UPS 1400	1	-

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This file and print server is designed to handle a high workload with significant storage and availability requirements. With this in mind, the IBM xSeries 250 was selected to provide an affordable price point for a high end file and print server with optional four-way Pentium III Xeon processing, 1GB of system memory (expandable to 16GB), and availability such as battery-backed cache RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

IBM xSeries 330

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[3]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 330 At-A-Glance																
8654-11Y[1]	800	1/2	256	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/72.8GB	24X-10X	4/2	2/2
8654-31Y[1]	866	1/2	256	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/72.8GB	24X-10X	4/2	2/2
8654-41Y[1]	933	1/2	256	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/72.8GB	24X-10X	4/2	2/2
8654-51Y[1]	1GHz	1/2	256	256MB(R)/4GB	Rack (1U)	1/1	H	-	Y	2 x 10/100	U160	-	0/72.8GB	24X-10X	4/2	2/2

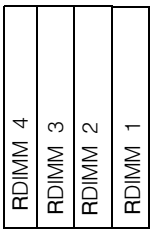
1. Housed in a 19in rack mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "xSeries 330 Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 133MHz Front-Side Bus (FSB).
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

xSeries 330 Processors

Part Number	Processor Upgrades with 256KB Cache (Full Speed)	SMP Support[1]	Processor Speed Upgrade[2]
10K3810	800MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	11Y	-
10K3806	866MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	31Y	1xY
10K0052	933MHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	41Y	1 … 3xY
10K0053	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	51Y	1 … 4xY

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 330 Memory



Part Number	Memory Description[1]
33L3142	128MB, 133MHz SDRAM ECC RDIMM II
33L3144	256MB, 133MHz SDRAM ECC RDIMM II
33L3146	512MB, 133MHz SDRAM ECC RDIMM II
33L3152	1GB, 133MHz SDRAM ECC RDIMM II

1. Memory RDIMMs must be installed in sequence from RDIMM connector 1 through connector 4. RDIMM size is not relevant.

Total Memory[1]	Quantity of RDIMMs Added			
256MB (1 x 256) Models	128MB (33L3142)	256MB (33L3144)	512MB (33L3146)	1GB (33L3152)
384MB	1	-	-	-
512MB	2 or	1	-	-
640MB	3	-	-	-
768MB	-	2 or	1	-
1024MB	-	3	-	-
1280MB	-	-	2 or	1
1792MB	-	-	3	-
2048MB	-	-	4[2]	-
2304MB	-	-	-	2
3328MB	-	-	-	3
4096MB (max)	-	-	-	4[2]

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

xSeries 330 Hard Disk Drive (HDD) and External Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2 or	1	-	2 or	1	-	2 or	1
36.4GB	-	2 or	1	-	2 or	1	-	2
72.8GB	-	-	2	-	-	2	-	-

This table does not represent all possible HDD configurations.

1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

Floppy / CD-ROM	Bay 1	Bay 2

Bay	Form Factor	Height	Front Access	Usage
1[1]	HS	SL	Yes	Open
2	HS	SL	Yes	Open

1. Boot drive should be located in bay 1.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
	Ultra160 Hard Disk Drives (HDD)				
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 2	2
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 2	2
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 2	2
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 2	2
19K0655	9.1GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	1 … 2	2
19K0656	18.2GB 15K-rpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	1 … 2	2
	External Storage Expansion Units[1]	**Form Factor**			
35311RU	Netfinity EXP300 Storage Expansion Unit[2]	Rack (3U)			
35601RU	Netfinity FAStT EXP500 Storage Expansion Unit[3]	Rack (3U)			
35421RU	FAStT200 Storage Server[4, 5]	Rack (3U)			
35422RU	FAStT200 HA Storage Server[4]	Rack (3U)			
19K1121	FAStT200 Redundant RAID Controller	-			

1. xSeries 330 does not include an external SCSI connector. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
2. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
3. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
4. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
5. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

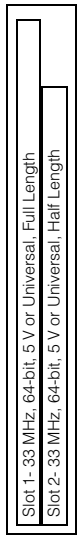
xSeries 330 Internal SCSI Cabling

xSeries 330 contains a DASD backplane supporting two hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable. If internal RAID is required, the cable can be attached to the internal connector of the optional RAID adapter. The cable is of sufficient length to attach to adapters in slot one but not slot two.

In configurations where external SCSI device attachment is required, a supported SCSI adapter or ServeRAID controller must be installed.

xSeries 330 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported
	Storage Controllers[1]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[2]	Full	32/64-bit	1
37L6080	ServeRAID-4M Ultra160 SCSI Controller[3]	Full	32/64-bit	1
37L6889	ServeRAID-4H Ultra160 SCSI Controller[4]	Full	32/64-bit	1
19K4646	PCI Wide Ultra160 SCSI Adapter[5]	Half	32/64-bit	1, 2
02K3454	PCI Fast/Wide Ultra SCSI Adapter[6]	Half	32-bit	1, 2
	Fibre Storage Controllers and Options[7]			
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1, 2
35521RU	FAStT500 Storage Server	-	-	-
35421RU	FAStT200 Storage Server	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[8]	-	-	-
	Networking[9]			
	Ethernet			
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1, 2
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1, 2
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1, 2
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1, 2
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1, 2
	Token Ring			
34L0701	Token-Ring 16/4 PCI Adapter2 with Wake on LAN[10]	Half	32-bit	1, 2
34L5001	16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1, 2
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1, 2
	Communications[11]			
33L4618	PCI V.90 56 Data/Fax Modem	Half	32-bit	1, 2
37L14xx	Serial I/O SST 8, 16 and 128 port adapters[12]	Half	32-bit	1, 2
	Systems Management[13]			
01K7209	Netfinity Advanced System Management PCI Adapter	Full	32-bit	1
03K9309	Netfinity Advanced System Management Interconnect Cable Kit	-	-	-
36L9654	Netfinity Advanced System Management Token-Ring Connection	-	-	-



Exterior Connector Access

1. xSeries 330 has an integrated single channel Ultra160 SCSI Controller.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz Power PC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to a cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and one external 0.8mm VHDCI Ultra160 connector. Support for external SCSI devices only. A five-drop terminated LVD SCSI cable is included but not supported for use in this server.
6. For use in supporting external SCSI devices such as tape drives.
7. See the Fibre Array Solutions section for additional configuration information.
8. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
9. xSeries 330 includes dual full-duplex, 10/100Mbps Ethernet controllers.
10. The Wake on LAN function of this option is not supported by this server.
11. xSeries 330 includes two USB ports and a high speed serial/asynchronous port (NS16550A compatible).
12. See Appendix E for details on Serial I/O Options and configuration limitations.
13. xSeries 330 has a single integrated system management port and a single RS485 port.

xSeries 330 Power, Monitor & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
06P4792	Cable Chain Technology Cable Kit[6]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), stealth black[8]
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II

1. The xSeries 330 includes a worldwide, voltage sensing 200W power supply and two 9ft line cords. One line cord contains a 110V NEMA 5-15P connector while the other contains an IEC 320 C14 for attachment to a high voltage PDU or UPS.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 330 uses an SVGA controller (S-3 Savage4 chipset) with 8MB of video memory.
6. A Cable Chain Technology Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5 ft) breakout cable for attachment to a keyboard. mouse and monitor, as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 245mm (9.6in) chaining cable is not long enough, A maximum of 42 xSeries 330s are supported in a single chain. No more than one C2T Cable kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable is required (P/N 09N4293 or 94G7447).
7. Installation within a rack requires optional Monitor Compartment (P/N94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
	Rack and NetBAY[1, 2]
930842P	Netfinity Enterprise Rack[3]
930842X	Netfinity Enterprise Expansion Cabinet[3]
930842S	NetBAY 42 Enterprise Rack Cabinet (ER)
930842E	NetBAY 42 Enterprise Expansion Rack Cabinet (EX)
06P6048	NetBAY Enterprise Rack Perforated Door Kit
9306900	Netfinity Rack[4]
06P6010	Netfinity Rack Front Door Kit[5]
9306910	Netfinity Rack (includes perforated front door)
36L9703	Netfinity Rack Extension Kit[6]
9306200	Netfinity NetBAY22[7]
36L9702	NetBAY22 Rack Extension Kit[6]
36L9701	Netfinity NetBAY3E[8]
	Keyboard and Mouse[9]
06P4792	Cable Chain Technology Cable Kit
28L4707	Netfinity Rack Keyboard Tray
28L3644	Space Saver II Keyboard[10]
28L3621	Preferred Keyboard (stealth black)[11]
28L3673	Sleek 2-button Stealth Black Mouse

1. xSeries 330 is housed in a 19in rack mountable drawer and requires one of the racks listed here. See Rack Cabinet and Options section for IBM rack supported devices.
2. To provide adequate cooling, Blank Filler Panel Kit (P/N 94G6670) should be placed on the front of any unused rack space. If non-IBM racks are to be used, assure that both the front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Clearance between the EIA mounting rails and rack side covers must be less than 13mm (0.5in) to prevent air re-circulation from back to front. Nonrack installations are not supported.
3. To enable proper cooling, the front door must be removed, or a NetBAY42 Enterprise Rack Perforated Door Kit (P/N 06P6048) can replace the standard glass door of either the Enterprise Rack or Enterprise Expansion Cabinet.
4. To enable proper cooling, optional Netfinity Rack Front Door Kit (P/N 06P6010) must be installed or the front door must be removed.
5. Provides a perforated front door replacement for the standard glass door of a Netfinity Rack (P/N 9306900).
6. Although not required, the use of an appropriate Extension Kit is recommended to improve cable management.
7. To enable proper cooling, the front door must be removed.
8. Up to three xSeries 330s are supported for installation in a NetBAY3E and up to three NetBAY3Es are supported while installed beneath an xSeries 370 / Netfinity 8500R. An x370 / 8500R must be installed on top of the NetBAY3E. and the NetBAY3E bezel should be removed.
9. A Cable Chain Technology Cable Kit (P/N 06P4792) is required for the attachment of console devices to one or multiple chained xSeries 330s. The kit contains a 2M (6.5ft) breakout cable for attachment to a keyboard, mouse and monitor, as well as a 2M (6.5ft) chaining cable for connecting two xSeries 330s together when the standard 245mm (9.6in) chaining cable is not long enough. A maximum of 42 xSeries 330s are supported in a single chain. No more than one kit may be used. If the last server in the chain is connected to a console switch rather than directly to a monitor, a console cable is required (P/N 09N4293 or 94G7447).
10. Installation within a rack requires optional keyboard tray (P/N 28L4707) which stows in ready-to-use position.
11. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 330 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
09N4041	12/24GB DDS/4 4mm Internal SCSI Tape Drive	N/A[1]	8	89mm (3.5in) HH or 133mm (5.25in) HH	Y	Y	3551001
09N4042	10/20GB NS Internal SCSI Tape Drive	N/A[1]	8	89mm (3.5in) SL or 133mm (5.25in) HH	Y	Y	3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	N/A[1]	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive	N/A[1]	8	133mm (5.25in) FH	N	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
00N8016	100/200GB LTO Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
External Tape Libraries[3]							
3502R14	DLT Tape Library	-	16	Rack	Y	N/A	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL[4]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[5]	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit[2]	-	16 LVD	Int	Y	N	3551001

1. xSeries 330 does not support internal tape drives and does not include an external SCSI connector. An external tape or internal tape with a tape enclosure, supported SCSI adapter and appropriate cable must be selected. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and supported adapter then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable.
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
5. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 330 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server[1]

Part Number	Description	Quantity
8654-41Y	xSeries 330 (Pentium III 933/256MB/0GB)	1
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[2]
06P4792	Cable Chain Technology Cable Kit	1[3]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 36.4GB of internal storage.
3. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a normal file server. The main difference is that an Internet server talks a different language (TCP/IP vs. NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to just one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this is mind, the xSeries 330 was selected to provide an affordable price point for the growing Internet server market with two-way Pentium III processing, 256MB of system memory (expandable to 4GB), and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used you can add the appropriate adapter.

File and Print Server[1]

Part Number	Description	Quantity
8654-11Y	xSeries 330 800MHz/256KB, 256MB ECC, OPEN, 24X, PCI	1
33L3142	xSeries 128MB 133MHz ECC SDRAM RDIMM	1[2]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[3]
06P4792	Cable Chain Technology Cable Kit	1[4]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 384MB of system memory.
3. For a total of 72.8GB of internal storage.
4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

A small business or departmental server is usually required to perform all typical server functions while servicing up to 100 users in a normal workgroup computing environment, but doesn't require the high-end performance and fault-tolerance properties of larger servers.

The sample configuration above consists of an xSeries 330 with 384MB of memory and 72.8GB of HDD space. It has enough processor power and memory to run most current network operating systems comfortably and enough HDD space to store a significant amount of data with additional external storage expansion still available. Demanding network traffic is effectively handled by the standard 100Mbps Ethernet connection.

This configuration also includes a UPS to keep the system protected during power surges and outages.

Application Server[1]

Part Number	Description	Quantity
8654-51Y	xSeries 330 1GHz/256KB, 256MB ECC, OPEN, 24X, PCI	1
10K0053	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	1
33L3144	xSeries 256MB 133MHz ECC SDRAM RDIMM	1[2]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2[3]
06P4792	Cable Chain Technology Cable Kit	1[4]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
28L3644	Space Saver II Keyboard	1
94G6674	APC Smart-UPS 1400RMB	1

1. This example shows a 19in rackable configuration. The rack components are not included.
2. For a total of 512MB of system memory.
3. For a total of 36.4GB of internal storage.
4. A single Cable Chain Technology Cable Kit (P/N 06P4792) is required for attachment of one or multiple (up to 42) chained xSeries 330s to a single monitor, mouse and keyboard.

An application server differs from a file and print server in that it has a higher workload in providing application serving requirements for users. With this in mind, the xSeries 330 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 512MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal storage and power protection with an APC Smart-UPS.

IBM xSeries 340 and Netfinity 4500R

xSeries 340 / Netfinity 4500R At-A-Glance

Part Number	Withdrawal Date[8]	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache (KB)	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[6]	Bays (Total/Avail)	Slots (Total/Avail)
8656-1RY[1]	27-Mar	733	1/2	256	128MB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[4]	0/ 218.4GB[5]	24X-10X	8/6[5]	5/5
8656-3RY[1]	27-Mar	800	1/2	256	128MB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[4]	0/ 218.4GB[5]	24X-10X	8/6[5]	5/5
8656-4RY[1]	-	866	1/2	256	128MB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[4]	0/ 218.4GB[5]	24X-10X	8/6[5]	5/5
8656-5RY[1]	-	933	1/2	256	128B(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[4]	0/ 218.4GB[5]	24X-10X	8/6[5]	5/5
8656-6RY[1, 7]	-	1GHz	1/2	256	128MB(R)/4GB	Rack (3U)	1/2	P, H, F	O - Power[3] S - Fans	Y	10/100	D,U160	4/2[4]	0/ 218.4GB[5]	24X-10X	8/6[5]	5/5

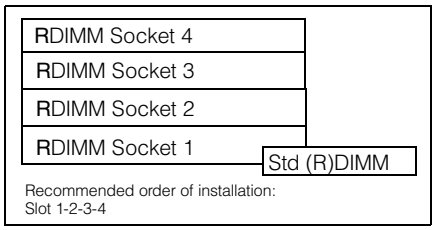
1. Housed in a 19in rack mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III processor with 133MHz front-side bus.
3. Power supply redundancy requires installation of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880).
4. xSeries 340 / Netfinity 4500R includes two available removable media bays that can be converted to three slim-line (SL) hot-swap bays with the addition of optional 3-Pack Hot-Swap DASD Upgrade (P/N 33L5050), doubling internal hard disk drive storage capacity.
5. Assumes installation of optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) which converts the two available removable media bays into three slim-line (SL) hot-swap bays.
6. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
7. This model is an IBM xSeries 340.
8. Not available from IBM after this date. Business Partner inventory may be available.

xSeries 340 / Netfinity 4500R Processors

Part Number	Processor Upgrades with 256 KB Cache (Full Speed)	SMP Support[1]	Processor Speed Upgrade[2]
19K4630	Netfinity 866MHz 133 FSB/256KB Upgrade with Pentium III Processor	4RY	1 … 3RY
19K4631	Netfinity 933MHz 133 FSB/256KB Upgrade with Pentium III Processor	5RY	1 … 4RY
19K4640	1GHz Upgrade with 133MHz FSB and 256KB Advanced Transfer Cache Pentium III Processor	6RY	I … 5RY

1. One additional processor may be installed, providing a maximum of two. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of two processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 340 / Netfinity 4500R Memory



Part Number	Memory Description[1]
33L3123	128MB, 133MHz SDRAM ECC RDIMM II
33L3125	256MB, 133MHz SDRAM ECC RDIMM II
33L3127	512MB, 133MHz SDRAM ECC RDIMM II
33L3129	1GB, 133MHz SDRAM ECC RDIMM II

1. The recommended order of installation is in sequence from Socket 1 to Socket 4. Memory size is not a factor.

Total Memory[1]	Quantity of RDIMMs Added			
128MB (1 x 128) Models	128MB (33L3123)	256MB (33L3125)	512MB (33L3127)	1GB (33L3129)
256MB	1	-	-	-
384MB	2 or	1	-	-
512MB	3	-	-	-
640MB	-	2 or	1	-
896MB	-	3	-	-
1024MB	-	4[2]	-	-
1152MB	-	-	2 or	1
1664MB	-	-	3	-
2048MB	-	-	4[2]	-
2176MB	-	-	-	2
3200MB	-	-	-	3
4096MB (max)	-	-	-	4[2]

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. Requires removal of standard memory.

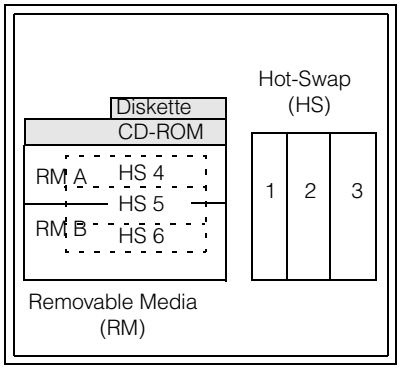
xSeries 340 / Netfinity 4500R Hard Disk Drive (HDD) and External Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4[2]	2	1	4[2]	2	1	4[2]	2
45.5GB	5[2]	-	-	5[2]	-	-	5[2]	-
54.6GB	6[2]	3	-	6[2]	3	-	6[2]	3
72.8GB	-	4[2]	2	-	4[2]	2	-	4[2]
91GB	-	5[2]	-	-	5[2]	-	-	5[2]
109.2GB	-	6[2]	3	-	6[2]	3	-	6[2]
145.6GB	-	-	4[2]	-	-	4[2]	-	-
182GB	-	-	5[2]	-	-	5[2]	-	-
218.4GB (max)	-	-	6[2]	-	-	6[2]	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	-	Yes	Diskette
-	133mm (5.25in)	-	Yes	IDE CD-ROM
1 … 3	HS	SL[1]	Yes	Open
A, B	133mm (5.25in)	HH[2]	Yes	Open
4 … 6[3]	HS	SL[1]	Yes	Open

1. Half-High devices are NOT supported.
2 Two half-high (HH) bays can be combined to support a single full-high (FH) device. By installing Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050), bays A and B are transformed into three SL hot-swap bays 4 … 6.
3. To enable bays 4 … 6, optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.



Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty
	Ultra160 HDDs				
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]
	Associated Options				
33L5050	Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit[2]	-	3 x SL	4 … 6	-

	External Storage Expansion Units[3]	**Form Factor**
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 340 / Netfinity 4500R ships with Bays 1 … 3 enabled. To enable installation of greater than three HDDs requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. The backplane may be cabled directly to the second integrated SCSI channel or be supported by the same SCSI channel as the standard backplane through the use of an included repeater card.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

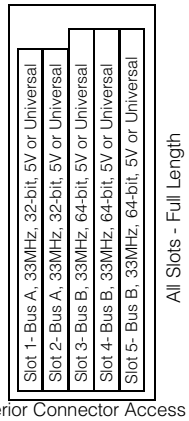
xSeries 340 / Netfinity 4500R Internal SCSI Cabling

The xSeries 340 and Netfinity 4500R contain a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated Ultra160 SCSI controller through a 16-bit LVD SCSI cable. A single-drop 16-bit SCSI cable is included with the server for attachment from the second internal Ultra160 connector to a removable media bay device. If an LVD attachment is required or more than one media bay device is required, a terminated two-drop 16-bit LVD SCSI cable available in the Netfinity Media Bay Conversion Kit (P/N 10K2340) must be ordered. No external SCSI port is included.

If optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is installed in the removable media bays, four cabling options are possible. Included with this option is a 16-bit LVD SCSI cable, identical to the one used for attachment of the standard hot-swap backplane, which can be used to attach the optional 3-Pack Ultra160 Hot-Swap backplane directly to the second onboard SCSI connector or that of an optional RAID adapter. Alternatively, a repeater card and cable are included which may be used to link the standard hot-swap backplane and optional hot-swap backplane together while utilizing the standard SCSI cable for attachment of the repeater card to one of the onboard SCSI connectors or that of an optional RAID adapter.

xSeries 340 / Netfinity 4500R I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported
	Storage Controllers[1]			
37L6091	ServeRAID-4L Ultra160 SCSI Controller[2]	Full	32/64-bit	1 … 5
37L6080	ServeRAID-4M Ultra160 SCSI Controller[3]	Full	32/64-bit	1 … 5
37L6889	ServeRAID-4H Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 5
19K4646	PCI Wide Ultra160 SCSI Adapter[5]	Half	32/64-bit	1 … 5
02K3454	PCI Fast/Wide Ultra SCSI Adapter[6]	Half	32-bit	1 … 5
	Fibre Storage Controllers and Options[7]			
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 5
35521RU	FAStT500 Storage Server	-	-	-
35421RU	FAStT200 Storage Server	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[8]	-	-	-
	Networking[9]			
	Ethernet			
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 5
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 5
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 5
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 5
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 5
	Token Ring			
34L0701	Token-Ring 16/4 PCIAdapter 2 with Wake on LAN[10]	Half	32-bit	1 … 5
34L5001	16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1 … 5
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[10]	Half	32-bit	1 … 5
	Communications[11]			
33L4618	PCI V.90 56 Data/Fax Modem[12]	Half	32-bit	1 … 5
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[13]	Half	32-bit	1 … 5
	Systems Management[14]			
01K7209	Netfinity Advanced System Management PCI Adapter[15]	Full	32-bit	1 … 5[16]
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[17]	-	-	-
36L9654	Netfinity Adv8nced System Management Token-Ring Connection[18]	-	-	-
	Host Attach			
9086001	Netfinity ESCON™ Adapter[19]	Full	32-bit	1 … 5[20]


Slot 1- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 2- Bus A, 33MHz, 32-bit, 5V or Universal
Slot 3- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 4- Bus B, 33MHz, 64-bit, 5V or Universal
Slot 5- Bus B, 33MHz, 64-bit, 5V or Universal
All Slots - Full Length
Exterior Connector Access

1. xSeries 340 / Netfinity 4500R include a dual-port, dual-channel Ultra160 SCSI controller for internal use only. No standard external port is available. See "Internal SCSI Cabling" for cabling alternatives. Due to xSeries / Netfinity 4500R's low profile, some adapters with connectors on the top edge may not have sufficient clearance to attach a cable. Cabling interferences are identified in the footnotes.
2. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
3. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two external 0.8mm VHDCI Ultra160 connectors.
4. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache. The internal connectors are not accessible due to cabling interference. Four external Ultra160 0.8mm VHDCI connectors are available.
5. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
6. PCI Fast/Wide Ultra SCSI Adapter provides one external 68-pin high density connector. The internal connectors are not accessible due to a cabling interference.
7. See Fibre Array Solutions section for additional configuration information.
8. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
9. xSeries 340 / Netfinity 4500R include a full-duplex, 10/100Mbps Ethernet PCI controller.
10. The Wake on LAN function of this option is not supported by this server.
11. xSeries 340 / Netfinity 4500R include two USB ports, two serial and one parallel port.
12. Due to homologation variances, modem availability may differ by country.
13. See Appendix E for details on Serial I/O Options and configuration limitations.
14. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 340 / Netfinity 4500R works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/n 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
15. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56-watt AC adapter, which requires a separate power source. Provides an integrated 10/100 Ethernet port and a PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
16. A maximum quantity of one is supported.
17. Required for all xSeries and Netfinity Servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
18. Contains an IBM Turbo 16/4 Token-Ring PCI card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter (P/N 01K7209), and a PC Card to nine-pin D-Shell cable which is routed to an available adapter slot opening (reduces available slots by one). The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.
19. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
20. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

xSeries 340 / Netfinity 4500R Power, Monitor & Accessories

Part Number	Description
	Power[1]
37L6880	270W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1. xSeries 340 / Netfinity 4500R include a single 270W, hot-swap power supply and a single 9ft, 110V power cord with an IEC 320-C13 connector on the system end and NEMA 5-15P on the other end. Power supply redundancy can be achieved with the addition of optional 270W Hot-Swap Redundant Supply (P/N 37L6880).
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 340 / Netfinity 4500R use an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
Rack and NetBAY[1]	
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 5]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[4]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 340 / Netfinity 4500R are housed in a 19in rack mountable drawer and requires one of the racks listed here. See IBM Netfinity Rack Cabinet and Options section for IBM rack supported devices.
2. xSeries 340 / Netfinity 4500R ship without a keyboard or mouse.
3. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
4. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
5. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

xSeries 340 / Netfinity 4500R Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive[2]	A, B	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N[3]	N/A	3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	A+B	8	133mm (5.25in) FH	N[3]	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[3]	N/A	3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[2]	A, B	16 Ultra2 LVD	133mm (5.25in) HH	N[3]	N/A	3551001[1]
00N8016	100/200GB LTO Tape Drive[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[3]	N/A	3551001[1]
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader[2]	A+B	16 Ultra2 LVD	133mm (5.25in) FH	N[3]	N/A	3551001[1]
External Tape Libraries[4]							
3502R14	DLT Tape Library	-	16	Rack	Y	N/A	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL[5]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[6]	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit[1, 2]	-	16 LVD	Int	Y	N	3551001

Note: xSeries 340 / 4500R includes a single drop, 16-bit, single-ended, nonterminated SCSI cable for attachment of a device in Bay A or B to the second integrated Ultra160 SCSI channel or supported adapter. No external SCSI port is available. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector.
1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. LVD support for LVD devices requires installation of the 16-bit multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
3. Termination requires installation of the multi-mode terminated, two-drop, LVD SCSI cable included with optional Media Bay Tray and LVD Cable Kit (P/N 10K2340).
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full- high (FH) or four- half high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
6. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

xSeries 340 / Netfinity 4500R Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8656-5RY	Netfinity 4500R Pentium III 933MHz/256KB L2, 128MB ECC, OPEN, 24X, PCI (Rack 3U)	1
33L3123	128MB SDRAM ECC RDIMM II	1[1]
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
37L6880	270W Hot-Swap Redundant Power Supply	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 256MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 18.2GB.

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually this type of server has the same characteristics as a file server. The main difference is that an Internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind the Netfinity 4500R was selected to provide an affordable price point for the growing Internet server market, 256MB of system memory (expandable to 4GB), and availability features such as RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast Ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

Application Server

Part Number	Description	Quantity
8656-6RY	xSeries 340 Pentium III 1GHz/256KB L2, 128MB ECC, OPEN, 24X, PCI (Rack 3U)	1
19K4630	xSeries1GHz Upgrade with 133 FSB and 256KB Advanced Transfer Cache Pentium III Processor	1
33L3125	256MB 133MHz SDRAM ECC RDIMM II	1[1]
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	3[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
37L6880	Netfinity 270W Hot-Swap Redundant Power Supply	1
94G6674	APC Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 384MB of system memory.
2. Three HDDs are used for RAID 5 protection. Effective capacity is two HDDs or 36.4GB.

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the xSeries 340 was selected to provide an affordable price point for an application server with two-way Pentium III processing, 384MB of system memory (expandable to 4GB), and availability features such as battery-backed cache, RAID-protected internal hot-swap storage and power protection with an APC Smart-UPS.

xSeries 340 High Availability Cluster (P/N 25P1823 and 25P1824)[1]

(Refer to High Availability and Scalable Cluster Solutions section)

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

IBM xSeries 350 and Netfinity 6000R

Part Number	Withdrawal Date[8]	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[5]	Bays (Total/Avail)	Slots (Total/Avail)
xSeries 350 / 6000R At-A-Glance																	
8682-1RY[1]	02-May	700	1/4	1MB	512MB(R)/16GB[3]	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U160	2/0	0/218.4GB	40X-17X	8/6[6]	6/6
8682-2RY[1]	02-May	700	1/4	2MB	512MB(R)/16GB[3]	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U160	2/0	0/218.4GB	40X-17X	8/6[6]	6/6
8682-4RY[1, 7]	-	700	1/4	1MB	512MB(R)/16GB[3]	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U160	2/0	0/218.4GB	48X-20X	8/6[6]	6/6
8682-5RY[1, 7]	-	700	1/4	2MB	512MB(R)/16GB[3]	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U160	2/0	0/218.4GB	48X-20X	8/6[6]	6/6
8682-6RY[1, 7]	-	900	1/4	2MB	512MB(R)/16GB[3]	Rack (4U)	1/3	P, S, H, F	S-Fans O-Power[4]	Y	10/100	D,U160	2/0	0/218.4GB	48X-20X	8/6[6]	6/6

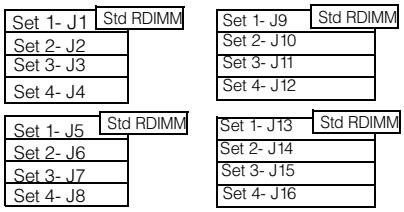
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "xSeries 350 and Netfinity 6000R Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III Xeon processor with full speed ECC L2 cache and 100MHz access to memory and I/O buses. IBM intends to make available an xSeries 350 model containing an Intel 800MHz/2MB L2 Cache Pentium II Xeon processor when Intel makes this processor generally available to the marketplace.
3. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
4. N+1 power supply redundancy requires a minimum of one optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Robust configurations may require two. See "Power" under "Netfinity 6000R Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. xSeries 350 / Netfinity 6000R includes three hot-swap bays. Optional Netfinity 3-Pack Ultra 160 Hot-Swap Expansion Kit (P/N 33L5050) expands the total hot-swap bays to six.
7. This model is an IBM xSeries 350.
8. Not available from IBM after this date. Business Partner inventory may be available.

xSeries 350 and Netfinity 6000R Processor Upgrades

Part Number	Processor Upgrades with Full Speed Cache	SMP Support[1]	Processor Speed Upgrade[2]
00N7946	Netfinity 700MHz/1MB Upgrade with Pentium III Xeon Processor	1RY, 4RY	-
00N7944	Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor	2RY, 5RY	1RY, 4RY
19K4633	900MHz/2MB Upgrade with Pentium III Xeon Processor	6RY	1 … 5RY

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.Processors must be installed in numerical order from slot one to slot four.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 350 and Netfinity 6000R Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory[1]	Quantity of RDIMMs Added[2]			
	128MB (33L3113)	256MB (33L3115)	512MB (33L3117)[4]	1GB (33L3119)
512MB	4 x 128 RDIMMs standard	-	-	-
1GB	4	-	-	-
1.5GB	-	4	-	-
2GB	4	4	-	-
2.5GB	-	8	-	-
3GB	4	-	4	-
4GB	4	4	4	-
5GB	4	-	8	-
6GB[3]	-	8	8	-
7GB[3]	-	4	12	-
8GB[3]	-	-	16	-
9GB	4	-	-	8
10GB[3]	-	-	12	4
12GB[3]	-	-	8	8
14GB[3]	-	-	4	12
16GB[3] (max)	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33l3115.
3. Requires removal of standard RDIMMs.
4. The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

Part Number	Memory Description[1]
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM[2]
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM
33L3147	2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB)[2]

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four. Chipkill support is provided on the memory card.
2.Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117).

xSeries 350 and Netfinity 6000R Hard Disk Drive (HDD) Storage

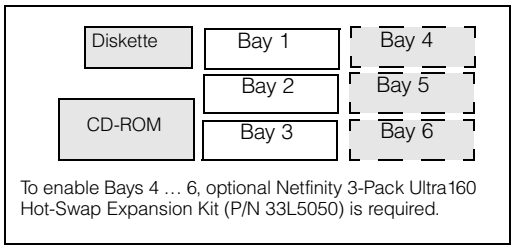
Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4[2]	2	1	4[2]	2	1	4[2]	2
45.5GB	5[2]	-	-	5[2]	-	-	5[2]	-
54.6GB	6[2]	3	-	6[2]	3	-	6[2]	3
72.8GB	-	4[2]	2	-	4[2]	2	-	4[2]
91GB	-	5[2]	-	-	5[2]	-	-	5[2]
109.2GB	-	6[2]	3	-	6[2]	3	-	6[2]
145.6GB	-	-	4[2]	-	-	4[2]	-	-
182GB	-	-	5[2]	-	-	5[2]	-	-

218.4GB (max)	-	-	6[2]	-	-	6[2]	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
1 … 3	HS	SL[1]	Yes	Open
4 … 6[2]	HS	SL[1]	Yes	Open

1. Half-high (HH) devices are NOT supported.
2. To enable Bays 4 … 6, optional Netfinity 3-Pack Utra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.



To enable Bays 4 … 6, optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) is required.

Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty
Ultra160 Hard Disk Drives (HDD)					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 6	6[1]
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
37L7205	8.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 6	6[1]
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 6	6[1]

	External Storage Expansion Units[3]	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 350 / Netfinity 6000R ships with bays one to three enabled. To enable installation of greater than three HDDs requires Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050).
2. Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) includes a hot-swap backplane and associated components for two cabling options. Within the option are two 16-bit LVD SCSI cables. One can be attached from the 3-pack Ultra160 Hot-Swap backplane to the second connector of the dual-channel Ultra160 SCSI controller, the other, through the use of a repeater card included with the option, can be cabled directly to the standard backplane. Utilizing the second channel will eliminate the possibility of attaching external devices to that channel.
3. Not supported by the onboard external SCSI port. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

Netfinity 6000R Internal SCSI Cabling

The Netfinity 6000R contains a DASD backplane supporting three hot-swap, SCA-2 compliant drive bays. The backplane is connected to one of the internal connectors of the integrated dual-channel Ultra160 SCSI controller through a 16-bit LVD SCSI cable. An optional Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit (P/N 33L5050) can be installed to provide additional internal HDD storage capacity. Within this option are two 16-bit LVD SCSI cables. One can be attached from the 3-Pack Ultra Hot-Swap backplane to the second connector of the dual-channel Ultra160 SCSI controller, the other, through the use of a repeater card included with the option, can be cabled directly to the standard backplane.

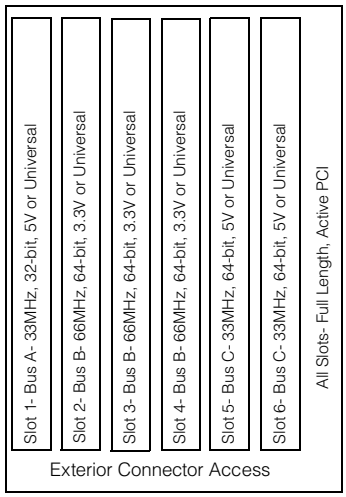
In configurations where external SCSI device attachment is required instead of additional internal HDD storage, a second 16-bit LVD SCSI cable is included with the server. One end of the cable can be attached to the second Ultra160 connector and the other is attached to the external 0.8mm VHDCI connector on the back of the chassis. This provides an external connection to support LVDS devices.

xSeries 350 and Netfinity 6000R I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	32/64-bit	1 … 6[7]	X	Universal	33
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	1, 5, 6	-	5	33
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32/64-bit	1 … 6	-	Universal	66
	Fiber Storage Controllers and Options[9]						
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 6	X	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-	-	-	-
	Networking[11]						
	Ethernet						
09N9901	Netfinity 10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 6[7]	X	Universal	33
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 6[7]	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 6[7]	X	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 6[7]	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 6	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12]	Half	32-bit	1 … 6[7]	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X	Universal	33
	Communications[13]						
33L4618	PCI V.90 56 Data/Fax Modem[14]	Half	32-bit	1, 5, 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters[15]	Half	32-bit	1, 5, 6[15]	-	5	33
	Systems Management[16]						
01K7209	Netfinity Advanced System Management PCI Adapter[17]	Full	32-bit	1, 5, 6[18]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[19]	-	-	-	-	-	-
36L9654	Netfinity Advanced System Management Token-RIng Connection[20]	-	-	-	-	-	-

1.The 5V - 33MHz slots support Universal or 5V adapters. A universal voltage-66MHz adapter plugged into these slots will operate at 33MHz.The 3.3V slots support universal or 3.3V adapters. A universal voltage-33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.
2. All six slots are full-length hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat
3. xSeries 350 / Netfinity 6000R includes a dual-port, dual-channel Ultra160 SCSI controller. See "Internal SCSI Cabling" for cabling alternatives.
4. ServeRAID-4L Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
6. ServeRAID-4H Ultra160 SCSI controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
7. Installation of a 33MHz adapter into a Bus B 66MHz slot will slow operation of all Bus B slots to 33MHz.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. See Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
11. xSeries 350 / Netfinity 6000R has an integrated 10/100 PCI Ethernet Controller.
12. The Wake on LAN function of this option is not supported by this server.
13. xSeries 350 / Netfinity 6000R includes two USB ports, two serial and one parallel port.
14. Due to homologation variances, modem availability may differ by country.
15. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/Ns 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
16. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into xSeries 350 / Netfinity 6000R works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. A maximum quantity of one is supported.

19. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) includes the contents of this option. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
20. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to 9-pin D-Shell cable which is routed to an available adapter slot opening (reduces available slots by one). The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together.


Slot 1- Bus A- 33MHz, 32-bit, 5V or Universal
Slot 2- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 3- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 4- Bus B- 66MHz, 64-bit, 3.3V or Universal
Slot 5- Bus C- 33MHz, 64-bit, 5V or Universal
Slot 6- Bus C- 33MHz, 64-bit, 5V or Universal
All Slots- Full Length, Active PCI
Exterior Connector Access

xSeries 350 and Netfinity 6000R Power, Monitor & Accessories

Part Number	Description
	Power[1]
37L6880	270W Hot-Swap Redundant Power Supply[2]
	Uninterruptible Power Supply (UPS)[3]
94G6674	APC Smart-UPS 1400RMB[4]
94G6676	APC Smart-UPS 3000RMB[4]
37L6861	APC Smart-UPS 5000RMB[5]
	Monitors[6]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[7]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[7]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[7]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[8]

1. xSeries 350 / Netfinity 6000R systems include a single 270W, hot-swap power supply and two 9ft power cords, one high voltage IEC 320-C13 and one low voltage IEC 320-C13 to NEMA 5-15P. N+1 power supply redundancy may be achieved with the addition of optional 270W Hot-Swap Redundant Power Supply (P/N 37L6880). Redundancy for configurations of greater than 270W requires installation of a second optional supply. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the Netfinity 6000R. The following table is provided as a reference.

Number of Power Supplies	System Configuration Supported
1	**Non-Redundant**
	Up to two processors
	Up to three PCI adapters
	Up to three HDDs
	Up to eight memory RDIMMs

2. 270W Hot-Swap Redundant Power Supply (P/N 37L6880) includes a single low voltage 9ft power cord.
3. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
4. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
5. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
6. xSeries 350 / Netfinity 6000R uses an SVGA controller (S3 Savage4 chipset) with 8MB of video memory.
7. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
8. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
Rack and NetBAY[1]	
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
36L9703	Netfinity Rack Extension Kit
9306200	Netfinity NetBAY22
36L9702	Netfinity NetBAY22 Rack Extension Kit
Keyboard and Mouse[2]	
28L3644	Space Saver II Keyboard[3, 4]
01K1260	TrackPoint IV 104-Key Black Keyboard[4, 5]
28L3621	Preferred Keyboard (stealth black)[5]
28L3673	Sleek 2-Button Stealth Black Mouse

1. xSeries 350 / Netfinity 6000R is housed in a 19in rack mountable drawer and requires one of the racks listed here. See "IBM Netfinity Rack Cabinet and Options" section for IBM rack supported devices.
2. xSeries 350 / Netfinity 6000R ships without a keyboard or mouse.
3. Installation within a rack requires optional keyboard tray P/N 28L4707 (stows in "ready-to-use" position).
4. Advanced TrackPoint IV features are not available on IBM Netfinity systems.
5. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 350 and Netfinity 6000R Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	N/A[1]	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3551001[2]
09N4040	20/40GB DLT Internal SCSI Tape Drive	N/A[1]	8	133mm (5.25in) FH	N	Y	3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[2]
00N8016	100/200GB LTO Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
24P2396	100/200GB LTO Half-High Tape Drive	N/A[1]	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[2]
Tape Autoloaders							
00N7992	120/240GB DDS/4 Tape Autoloader	N/A[1]	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[2]
External Tape Libraries[3]							
3502R14	DLT Tape Library	-	16	Rack	Y	N/A	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
External Tape Enclosures							
3551001	NetMEDIA Storage Expansion Unit EL[4]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[5]	-	16 LVD	-	N	N	3551001
Associated Options							
10K2340	Media Bay Tray and LVD Cable Kit[2]	-	16 LVD	Int.	Y	N	3551001

1. IBM xSeries 350 / Netfinity 6000R does not support internal tape drives. An external tape or tape enclosure must be used. If not used internally, the second integrated Ultra160 connector may be routed to an external 0.8mm VHDCI connector with a cable included with the server. All tape drives and enclosures are supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables-Storage Units-Controllers to select an appropriate external cable.
2. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
5. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

Internet Server

Part Number	Description	Quantity
8682-1RY	Netfinity 6000R 700/1MB Xeon, 512MB(R) ECC, Open, 40X, PCI (Rack 4U)	1
37L6091	ServeRAID-4L Ultra160 SCSI Controller	1
33L5050	Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit	1
37L7201	Netfinity 9.1GB Ultra160 SCSI Hot-Swap SL HDD	4[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
3551001	NetMEDIA Storage Expansion Unit EL	1
03K9310	2M External Ultra2 SCSI Cable	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. Four HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is two HDDs or 18.2GB

An Internet server handles all requests from the Internet (Intranet or Extranet). Usually, this type of server has the same characteristics as a file server. The main difference is that an internet server talks a different language (TCP/IP vs NETBEUI or IPX/SPX) and often needs to do an extra security check (firewall). In the case of an Internet server, the server itself talks mostly to one client, the Internet Service Provider (ISP), instead of many clients as a file server does.

With this in mind, the IBM Netfinity 6000R was selected to provide an affordable price point for the growing Internet server market, 512MB of system memory (expandable to 16GB), and availability features such as RAID protected internal hot-swap storage and power protection with an APC Smart-UPS.

The network configuration depends on the method that will be used to connect the server to the Internet. Usually fast ethernet routers are used, but if other methods are used, you can add the appropriate adapter. The configuration includes a tape backup unit for secure backup of critical data in the event of a system or storage failure.

Application Server

Part Number	Description	Quantity
8682-2RY	Netfinity 6000R 700/2MB Xeon, 512MB(R) ECC, Open, 40X, PCI (Rack 4U)	1
00N7944	Netfinity 700MHz/2MB Upgrade with Pentium III Xeon Processor	3
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4[1]
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4[1]
33L5050	Netfinity 3-Pack Ultra160 Hot-Swap Expansion Kit	1
37L7203	Netfinity 36.4GB Ultra160 SCSI Hot-Swap SL HDD	4[2]
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1
00N7990	40/80GB DLT Internal SCSI Tape Drive	1
10K2340	Media Bay Tray and LVD Cable Kit	1
3551001	NetMEDIA Storage Expansion Unit EL	1
10L7113	NetMEDIA Systems Management Adapter	1
03K9310	Netfinity 2M Ultra2 SCSI Cable	1
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1
94G6674	APC Smart-UPS 1400RMB	1
37L6880	Netfinity 270W Hot-Swap Redundant Power Supply	2
Industry Standard 19in Rack, EIA-310D, min depth of 28in (711mm)		
9306200	Netfinity NetBAY22™	1
28L3644	Space Saver II Keyboard	1
94G6670	Blank Filler Panel Kit	2

1. For a total of 2GB of system memory.
2. Four HDDs are used for RAID 5 protection. Effective capacity is three HDDs or 109.2GB

An application server is designed to handle a high workload while providing application serving requirements for users. With this in mind, the IBM Netfinity 6000R was selected to provide an affordable price point for an application server with four-way Pentium III Xeon processing, 2GB of system memory (expandable to 16GB), and availability features such as battery-backed cache RAID protected internal hot-swap storage and power protection with an APC Smart-UPS.

IBM xSeries 370 and Netfinity 8500R

Part Number	Withdrawal Date[6]	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache	Memory (Std/Max) (R=RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor[3]	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)[4]	Bays (Total/Avail)	Slots (Total/Avail)
8681-7RY[1]	02-May	700	1/8	1MB	512MB[R]/32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/72.8GB	40X-17X	4/2	12/12
8681-8RY[1]	02-May	700	1/8	2MB	512MB[R]/32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/72.8GB	40X-17X	4/2	12/12
8681-1RX[1, 5]	-	700	1/8	1MB	512MB[R]/32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/72.8GB	48X-20X	4/2	12/12
8681-2RX[1, 5]	-	700	1/8	2MB	512MB[R]/32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/72.8GB	48X-20X	4/2	12/12
8681-3RX[1, 5]	-	900	1/8	2MB	512MB[R]/32GB	Rack (8U)	3/3	P, S, H, F	S-Fans, S-Power	Y	-	D, U2	2/0	0/72.8GB	48X-20X	4/2	12/12

1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "xSeries 370 / Netfinity 8500R Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III Xeon processor.
3. xSeries 370 / Netfinity 8500R includes a systems management adapter equivalent to the one shipped with option 01K7209 (Netfinity Advanced System Management PCI Adapter).
4. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
5. This model is an IBM xSeries 370.
6. Not available from IBM after this date. Business Partner inventory may be available.

xSeries 370 / Netfinity 8500R Processor Upgrades

Part Number	Processor Upgrades with 1MB or 2MB Full Speed Cache[1]	SMP Support[2]	Processor Speed/Cache Upgrade[3]
10K2330	Netfinity 8500R 700MHz/1MB Upgrade with Pentium III Xeon Processor	7RY, 1RX	4 … 6RY[5]
10K2166	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	8RY, 2RX	4 … 7RY[5]
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	3RX	4 … 8RY, 1RX, 2RX[5]
10K2335	Netfinity 4X Accelerator Filter	7RY, 8RY, 1 … 3RX[4]	4 … 7RY
10K2337	Netfinity Mezzanine Expansion Kit	7RY, 8RY, 1 … 3RX[4]	4 … 7RY

1. xSeries 370 / Netfinity 8500R architecture optimizes memory and bus performance using a 100MHz, five-port crossbar core chipset. Up to eight Pentium III Xeon processors are supported on two 100MHz P-6 CPU buses. The recommended order of processor installation is: Sockets A1, A3, A2, A4, B1, B3, B2, B4.
2. Up to seven additional processors may be installed, providing a maximum of eight. All processors must be identical in type, speed, and cache size. The fifth through eighth processors require a Netfinity Mezzanine Expansion Kit (P/N 10K2337)
3. Requires removal of the standard processor(s). A maximum of eight processors may be installed. Installation of greater than four processors requires the addition of a mezzanine board and two cache coherency filters. Required options which provide the board and filters vary by model. For more information refer to "Processor Upgrade Requirements." All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" and then "BIOS."
4. The fifth through eigth processors require this option. See "Processor Upgrade Requirements" for more information on when this option is required.
5. Replacement of the standard processor mezzanine board and the mezzanine board from any installed enablement kit of 550MHz models is required. See "Processor Upgrade Requirements" to determine specific model upgrade requirements.

Processor Upgrade Requirements[1, 2]

	Upgrade To			
Upgrade From	≤ 4 x 550MHz processors	> 4 x 550MHz processors	≤ 4 x 700MHz processors	> 4 x 700MHz processors
≤ 4 x 550MHz processors	-	1 x 28L4730 or 1 x 28L4727	1 x 10K2337[3]	1 x 10K2335, 2 x 10K2337[3]
> 4 x 550MHzprocessors	n/a	-	1 x 10K2337[3, 4]	2 x 10K2337[3, 5]
≤ 4 x 700MHz processors	n/a	n/a	-	1 x 10K2335, 1 x 10K2337

1. This table does not address the processor part numbers required. It does address the optional Enablement Kit, Filters, and Mezzanine Board part numbers required.
2. All processors must be identical in type, speed, and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."
3. Remove the standard processor mezzanine board.
4. Remove all optional Enablement Kit components.
5. Remove Enablement Kit mezzanine board. The Enablement Kit 4X cache coherency filters are supported for use with Netfinity Mezzanine Expansion Kit (P/N 10K2337).

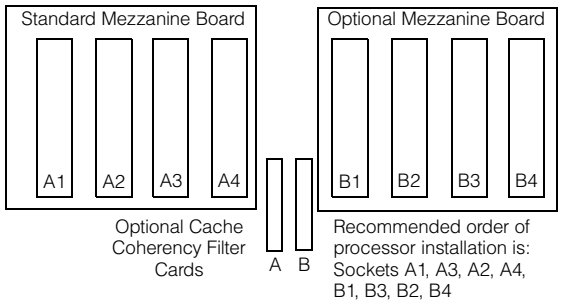
xSeries 370 / Netfinity 8500R ships with a single mezzanine board containing four Pentium III Xeon processor sockets with terminators in the unoccupied sockets. An additional mezzanine board may be added, expanding the number of processor sockets to eight. The two mezzanine boards are then linked through two cache coherency filter cards, one for each mezzanine board.

Option Content

xSeries 370 / Netfinity 8500R > 4-Way Enablement Kits
(P/N 28L4730 and P/N 28L4727)
- Support for 550MHz models only
- Required for installation of processors 5 … 8.
- One Processor Mezzanine Board
- Two cache coherency filter modules
  - 28L4730 economical 1X (256K entries)
  - 28L4727 high performance 4X (1M entries)
  - Filters may be used with Mezzanine Expansion Kit (P/N 10K2337)

Netfinity 4X Accelerator Filter (P/N 10K2335)
- Two cache coherency filter modules
- Requires Mezzanine Kit (P/N 10K2337)

Netfinity Mezzanine Expansion Kit (P/N 10K2337)
- One Processor Mezzanine Board
- Supports cache coherency filters from the following options:
  - P/N 10K2335
  - P/N 28L4730
  - P/N 28L4727
- Supports 700MHz and above processors only
- Required when upgrading models 8681-4RY … 6RY to 700MHz or above
- Required when adding fifth through eighth processors rated at 700MHZ or above



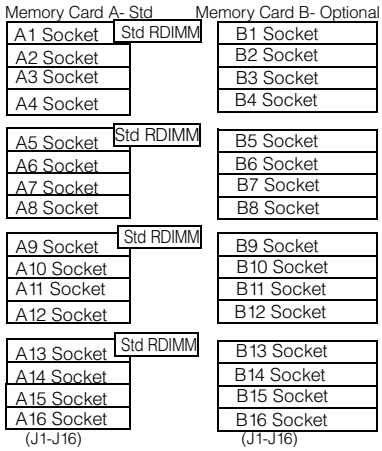
Optional Cache Coherency Filter Cards

Recommended order of processor installation is: Sockets A1, A3, A2, A4, B1, B3, B2, B4

All installed processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

xSeries 370 / Netfinity 8500R Memory

Total System Memory	Quantity of RDIMMs Added			
Std Models				
512MB (4 x 128)	**128MB (20L0245)**	**256MB (20L0247)**	**512MB (20L0249, 33L3149[7])**	**1GB (33L3056)**
640	1	-	-	-
768	2 or	1	-	-
1024	4 or	2 or	1	-
1280	6 or	3	-	-
1536	8 or	4 or	2 or	1
1792	10 or	5	-	-
2048	12 or	6 or	3	-
2560	16[2] or	8 or	4 or	2
2816	18[2] or	9	-	-
3072	20[2] or	10 or	5	-
3328	22[2] or	11	-	-
3584	24[2] or	12 or	6 or	3
4096	28[2] or	14[4] or	7	-
-	30[2] or	16[3]	-	-
4608	-	16[2] or	8 or	4
5120	-	18[2] or	9	-
5632	-	20[2] or	10 or	5
6144	-	22[2] or	11	-
6656	-	24[2] or	12 or	6
7680	-	28[2] or	14[4] or	7
8192	-	32[2, 3] or	16[3] or	8[3]
8704	-	-	16[2] or	8
9728	-	-	18[2] or	9
10752	-	-	20[2] or	10
11776	-	-	22[2] or	11
12800	-	-	24[2] or	12



Recommended order of RDIMM population for optimum cooling: 1, 5, 9, 13, 3, 7, 11, 15, 2, 6, 10, 14, 4, 8, 12, 16.

13824	-	-	26[2] or	13
14848	-	-	28[2] or	14[4]
15488	-	-	-	15[6]
16384	-	-	32[2, 3] or	16[3]
16896	-	-	-	16[2]
18944	-	-	-	18[2]
20992	-	-	-	20[2]
23040	-	-	-	22[2]
25088	-	-	-	24[2]
27136	-	-	-	26[2]
29184	-	-	-	28[2]
30720	-	-	-	30[5]
32768	-	-	-	32[3]

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.

NOTE: Cache line interleaving may be enabled by installing Netfinity 8500R Memory Expansion Card (P/N 28L4454) with as few as two RDIMMs. Matched pairs must be installed if the memory expansion card is present.
1. Network Operating Systems may limit the maximum amount of addressable memory. See the operating system specifications for further information.
2. Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required for installation of greater than 16 RDIMMs.
3. Requires removal of standard memory.
4. Models with 4 x 128 RDIMMs standard require Netfinity 8500R Memory Expansion Card (P/N 28L4454) for installation of greater than 16 RDIMMs.
5. Requires removal of all but two of the standard RDIMMs.
6. Requires removal of all but one of the standard RDIMMs.
7. When P/N 33L3149 is installed in servers that have been upgraded with an optional memory card, RDIMMs must match in slot pairs from one card to another (size, capacity and type).

Part Number	Memory Description[1]
20L0245	Netfinity 128MB SDRAM ECC RDIMM II
20L0247	Netfinity 256MB SDRAM ECC RDIMM II
20L0249	Netfinity 512MB SDRAM ECC RDIMM II
28L4454	Netfinity 8500R Memory Expansion Card[2]
33L3056	Netfinity 1GB SDRAM ECC RDIMM II
33L3149	512MB 100MHZ ECC SDRAM RDIMM[3]

1. xSeries 370 / Netfinity 8500R includes a single memory card with the ability to support up to 16GB of memory. All models contain four standard RDIMMs. For memory installation of greater than 16GB, xSeries 370 / Netfinity 8500R Memory Expansion Card (P/N 28L4454) is required. Installation of memory on systems containing a single memory card (standard on all models) has no restrictions on size or placement. When xSeries 370 / Netfinity 8500R Memory Expansion Card (P/N 28L4454) is installed, the memory RDIMM in each socket of Card A must match the RDIMM in the same socket on Card B. To enable cache line interleaving, both memory cards must be installed and configured identically.
2. Required for enablement of cache line interleaving or installation of greater than 16 RDIMMs. Configuration of the standard memory card (Card A) and optional 28L4454 (Card B) must be identical.
3. Due to the new technology used by 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3149), it should not be matched with Netfinity 512MB SDRAM ECC RDIMM II (P/N 20L0249) when populating Memory Card B.

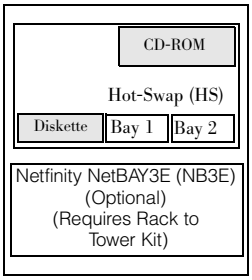
xSeries 370 / Netfinity 8500R Hard Disk Drive (HDD) Storage

Total Internal Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)[2]	18.2GB (37L7202)[2]	36.4GB (37L7203)[2]	9.1GB (37L7204)[2]	18.2GB (37L7205)[2]	36.4GB (37L7206)[2]	9.1GB (19K0655)[2]	18.2GB (19K0656)[2]
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
36.4GB	-	2	1	-	2	1	-	2
72.8GB (max)	-	-	2	-	-	2	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. xSeries 370 / Netfinity 8500R contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

Bay	Form Factor	Height	Front Access	Usage
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
-	89mm (3.5in)	SL	Yes	Diskette
1 … 2	HS	HH	Yes	Open
NB3E[1]	19in Rack	3U	Yes	Open

1. A total of three optional 3U NetBAY3Es can be stacked beneath a xSeries 370 / Netfinity 8500R which has Netfinity 8Ux28D Rack-to-Tower Kit (P/N 28L4705) installed. See IBM Netfinity NetBAY3x Stackable Enclosure section for supported devices.



Part Number	Description	RPM	Height	Bays Supported	Max Qty
	Ultra160 HDDs[1]				
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1, 2	2
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1, 2	2
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1, 2	2
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1, 2	2
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1, 2	2
37L7206	36.4GB 10-K Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1, 2	2
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	1, 2	2
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	1, 2	2

	External Storage Expansion Units[2]	Form Factor
35311RU	EXP300 Storage Expansion Unit[3]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[4]	Rack (3U)
35421RU	FAStT200 Storage Server[5, 6]	Rack (3U)
35422RU	FAStT200 HA Storage Server[5]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. xSeries 370 / Netfinity 8500R contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Not supported by the onboard external SCSI port. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
4. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

Internal SCSI Cabling

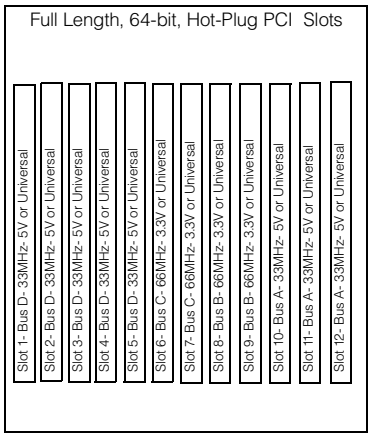
xSeries 370 / Netfinity 8500R systems contains an LVDS backplane supporting two hot-swap drive bays that support installation of up to two 3.5in, slim-high or half-high HDDs. The backplane is connected to the internal Wide Ultra2 SCSI controller through a 16-bit LVD SCSI cable. RAID support for the internal hot-swap drive bays is provided by adding a supported RAID adapter and moving the standard SCSI cable from the onboard controller to the optional RAID controller. The standard external Wide Ultra2 SCSI port uses a 0.8mm Very High Density Connector Interface (VHDCI).

xSeries 370 / Netfinity 8500R I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 12[7]	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 12[7]	X	Universal	33
19K4646	PCI Wide Ultra160 SCSI Adapter[6]	Half	32/64-bit	1 … 12	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	1 … 5, 10 … 12	-	5	33
	Fibre Storage Controllers and Options[8]						
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 12	X	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[9]	-	-	-	-	-	-
	Networking[10]						
	Ethernet						
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 12[7]	X	Universal	33
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 12[7]	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 12[7]	X	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 12[7]	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 12	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[11]	Half	32-bit	1 … 12[7]	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[11]	Half	32-bit	1 … 12[7]	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[11]	Half	32-bit	1 … 12[7]	X	Universal	33
	Communications[12]						
33L4618	PCI V.90 56 Data/Fax Modem[13]	Half	32-bit	1 … 5, 10 … 12	-	5	33
37L14xx	Serial I/O SST 8, 16 and 128 Port Adapters[14]	Half	32-bit	(1 … 5, 10 … 12)[14]	-	5	33
	Systems Management[15]						
03K9309	Netfinity Advanced Systems Management Interconnect Cable Kit[16]	-	-	-	-	-	-

36L9654	Netfinity Advanced System Management Token-Ring Connection[17]	-	-	-	-	-	-
02K6545	UltraSlim 56W AC Adapter[18]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[19]	Full	32-bit	(1 … 5, 10 … 12)[20]	-	5	33

1. The P-6 I/O bus supports four independent 64-bit PCI buses, two of which drive eight 33MHz, 5V slots (1-5, 10-12), while the other two buses drive four 66MHz, 3.3V slots (6-9). The 5V slots support Universal or 5V adapters. A 66MHz adapter plugged into these slots will operate at 33MHz. The 3.3V slots support Universal or 3.3V adapters. A 33MHz adapter plugged into these slots limits a 66MHz PCI adapter installed on the same bus to 33MHz.
2. All 12 slots are hot-plug capable using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
3. xSeries 370 / Netfinity 8500R includes a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller which supports either Single Ended (SE) or Low Voltage Differential SCSI (LVDS) modes. One internal connector and one external port with a 0.-mm Very High Density Connection Interface (VHDCI) are standard. The internal LVD SCSI cable has sufficient length to attach to an adapter located in slots 10 … 12. If a boot device (internal or external) is to be attached to an adapter, the adapter must reside in slots 10 … 12 due to BIOS scanning sequences.6.
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
6. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
7. Installation of a 33MHz adapter into a Bus A 66MHz slot will slow operation of all Bus A slots to 33MHz.
8. See Netfinity Fibre Array Solutions section for additional configuration information.
9. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
10. xSeries 370 / Netfinity 8500R does not include an onboard network controller.
11. The Wake on LAN function of this option is not supported by this server.
12. xSeries 370 / Netfinity 8500R includes two USB ports, two high-speed serial/asynchronous ports, (NS 16550A compatible), and one high-speed (up to 2MBps data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
13. Due to homologation variances, modem availability may differ by country.
14. See Appendix E for details on Serial I/O options and configuration limitations. A maximum of four Serial I/O adapters (any combination of P/N 37L1414, 37L1415, 37L1416, 37L1423) may be installed.
15. xSeries 370 / Netfinity 8500R ships standard with a Netfinity Advanced System Management PCI Adapter.
16. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection. Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
17. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.ibm.com/pc/us/netfinity. Select "Server Support." "Family," "Model," "Downloadable Files" and finally "Advanced System Management."
18. Although the xSeries 370 / Netfinity 8500R integrated Netfinity System Management PCI Adapter is powered continuously through the redundant power supply subsystem, an even higher level of availability is offered with the addition of UltraSlim 56W AC Adapter by allowing an independent power source or connection to a separate optional UPS.
19. Provides an ESCON MIC and DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
20. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server. Where possible, install in a minimally loaded bus.


Full Length, 64-bit, Hot-Plug PCI Slots
Slot 1- Bus D- 33MHz- 5V or Universal
Slot 2- Bus D- 33MHz- 5V or Universal
Slot 3- Bus D- 33MHz- 5V or Universal
Slot 4- Bus D- 33MHz- 5V or Universal
Slot 5- Bus D- 33MHz- 5V or Universal
Slot 6- Bus C- 66MHz- 3.3V or Universal
Slot 7- Bus C- 66MHz- 3.3V or Universal
Slot 8- Bus B- 66MHz- 3.3V or Universal
Slot 9- Bus B- 66MHz- 3.3V or Universal
Slot 10- Bus A- 33MHz- 5V or Universal
Slot 11- Bus A- 33MHz- 5V or Universal
Slot 12- Bus A- 33MHz- 5V or Universal

xSeries 370 / Netfinity 8500R Power, Monitor & Accessories

Part Number	Description
	Power[1]
	Uninterruptible Power Supply (UPS)[2]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1.xSeries 370 / Netfinity 8500R systems contain three 750W (at 220V), hot-swap power supplies which handle robust configurations while providing full redundancy. When operating at 110V, redundancy is limited to configurations not exceeding six processors, 24 memory RDIMMs, or eight PCI adapters. Each system ships with nine power cords: 3 x 220V, 3 x 110V, 3 x intra-rack 220V. Even though multiple UPSs may provide redundant power sources, systems management software does not currently take advantage of its power outage alerts.
2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimates.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 370 / Netfinity 8500R uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.

Part Number	Description
	Conversion Kits
28L4705	8Ux28D Rack-to-Tower Kit[1]
	Rack and NetBAY[2]
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack[3]
9306910	Netfinity Rack (includes perforated front door)
36L9703	Netfinity Rack Extension Kit
9306200	Netfinity NetBAY22[4]
36L9702	NetBAY22 Rack Extension Kit
36L9701	Netfinity NetBAY3E[5]
	Keyboard and Mouse[6]
28L3644	Space Saver II Keyboard[7, 8]
01K1260	TrackPoint IV 104-Key Black Keyboard[8, 9]
28L3621	Preferred Keyboard (stealth black)[9]
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3E with casters.
2. xSeries 370 / Netfinity 8500R is housed in a 19in rack mountable drawer and requires one of the racks listed here. See "IBM Netfinity Rack Cabinet and Options" section for IBM rack supported devices.
3. Netfinity Rack Extension Kit (P/N 36L9703) is required for proper rear door closure clearance.
4. NetBAY22 Rack Extension Kit (P/N 36L9702) is required for proper rear door closure clearance.
5. A maximum of three NetBAY3E enclosures may be stacked beneath a supported Netfinity tower server (Rack-to-Tower Kit28L4705 required). Optional NetBAY3Es must be shipped separately and not while attached to the base configuration. See IBM Netfinity NetBAY3X Stackable Enclosure section for supported devices.
6. xSeries 370 / Netfinity 8500R ships without a keyboard or mouse.
7. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
8. Advanced TrackPoint IV features are not available on IBM Netfinity sy.stems.
9. Installation within a rack requires optional keyboard tray P/N 28L4707. This keyboard cannot share a keyboard tray with a flat panel display.

xSeries 370 / Netfinity 8500R Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	N/A	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	N/A	8	133mm (5.25in) FH	N	Y	3503B0X[2], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[2], 3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
00N8016	100/200GB LTO Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive	N/A	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[1]
	Tape Autoloaders						
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	N/A	-
00N7992	120/240GB DDS/4 Tape Autoloader	N/A	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
	External Tape Libraries[3]						
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2x	Magstar MP 3570 Tape Subsystem		Diff	6U Rack	Y	N	-
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[4]	-	8, 16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[5]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[6]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[7]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1]	-	16 LVD	Int	Y	N	3551001

Note: xSeries 370 / Netfinity 8500R does not support internal tape drives but does include an external Ultra2 0.8mm VHDCI SCSI connector for attachment of an external tape or tape enclosure. All tape drives and enclosures are also supported by PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which has an external 0.8mm VHDCI connector. Select tape drive, enclosure and controller then use Appendix D: Cables - Storage Units - Controllers to select an appropriate external cable

1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
5. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

Sample Configurations

The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability - Rack

Part Number	Description	Quantity	Usage
8681-8RY	Netfinity 8500R 700/2MB, 512MB ECC, Open, 40X, PCI (Rack 8U)	1	Power Redundancy standard
10K2166	Netfinity 8500R 700MHz/2MB Upgrade with Pentium III Xeon Processor	5	Total of 6 SMP processors
10K2335	Netfinity 4X Accelerator Filter	1	Required for greater than 4 processors
10K2337	Netfinity Mezzanine Expansion Kit	1	Required for greater than 4 processors
20L0247	Netfinity 256MB SDRAM ECC RDIMM II	8	Total of over 2GB of memory
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	NOS mirroring
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID Controller - NOS plus EXP300
06P3601	10/100 Ethernet Server Adapter	1	-
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
37L6861	APC Smart-UPS 5000RMB (5U)	1	-
	External Storage		
3551001	NetMEDIA Storage Expansion Unit EL	1	External Tape Drive Enclosure
00N7990	40/80GB DLT Internal SCSI Tape Drive	2	Installs in 3551001
10K2340	Media Bay Tray and LVD Cable Kit	1	-
03K9310	2M External Ultra2 SCSI Cable	1	3551001 to onboard SCSI
35311RU	EXP300 Storage Expansion Unit	1	Provides additional 14 bays
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	6	RAID 5 with Hot-Spare in EXP300
	Rack Options		
9306200	Netfinity NetBAY22	1	Monitor and keyboard mount on top
36L9702	NetBAY22 Rack Extension Kit	1	Required for rear door closure
94G6667	Power Cable - Type A14 (4)	2	-
94G6670	Blank Filler Panel Kit	1	-

This high availability server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. The configuration includes enough disk drives to mirror the operating system and provide a RAID 5 data environment, power supply redundancy by the server and EXP300 and a UPS for power even during a blackout. A rack mounted tape drive is included to back up that all important asset--data. This server represents the leading edge in high availability.

Notes/Exchange - Stack

Part Number	Description	Quantity	Usage
8681-7RY	Netfinity 8500R 700/1MB, 512MB ECC, OPEN, 40X, PCI (Rack 8U)	1	Power redundancy standard
10K2330	Netfinity 8500R 700MHz/1MB Upgrade with Pentium III Xeon Processor	5	Total of 6 SMP processors
10K2335	Netfinity 4X Accelerator Filter	1	Required for greater than 4 processors
10K2337	Netfinity Mezzanine Expansion Kit	1	Required for greater than 4 processors
20L0249	Netfinity 512MB SDRAM ECC RDIMM II	3	Total of 2GB of memory
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	NOS Mirroring
06P3601	10/100 Ethernet Server Adapter	2	-
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	RAID Controller-NOS plus EXP300
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black	1	-
28L3644	Space Saver II Keyboard	1	-
37L6861	APC Smart-UPS 5000RMB (5U)	1	-
	External Storage		
3551001	NetMEDIA Storage Expansion Unit EL	1	External Tape Enclosure - Install in NetBAY3E
00N7990	40/80GB DLT Internal SCSI Tape Drive	2	Installs in 3551001
10K2340	Media Bay Tray and LVD Cable Kit	1	-
03K9310	2M External Ultra2 SCSI Cable	1	3551001 to Onboard SCSI
35311RU	EXP300 Storage Expansion Unit	1	Provides additional 14 Bays, 1 x 2M cable
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	14	RAID 5 with Hot-Spare in EXP300

Stack Options			
28L4705	Netfinity 8Ux28D Rack-to-Tower Kit	1	-
36L9701	Netfinity NetBAY3E	3	3 x 3U enclosure for UPS, EXP300, Tape

Refer to the IBM Datacenter Solutions section for xSeries 370 / Netfinity 8500R cluster solutions configured with Fibre Channel storage components and connections. Datacenter solutions are also certified for Windows 2000 and NT 4.0 operating systems.

IBM Netfinity 7100

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache	Memory (Std/Max) (R = RDIMM)	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
Netfinity 7100 At-A-Glance																
8666-31Y	700	1/4	1MB	256MB(R)/16GB	Tower	2/4	P, H, F	S-Fans S-Power	Y	10/100	D,U2	4/2	0/364GB	40X-17X[3]	14/12	6/6
8666-3RY[1]	700	1/4	1MB	256MB(R)/16GB	Rack (8U)	2/4	P, H, F	S-Fans S-Power	Y	10/100	D,U2	4/2	0/364GB	40X-17X[3]	14/12	6/6
8666-41Y	700	1/4	2MB	256MB(R)/16GB	Tower	2/4	P, H, F	S-Fans S-Power	Y	10/100	D,U2	4/2	0/364GB	40X-17X[3]	14/12	6/6
8666-4RY[1]	700	1/4	2MB	256MB(R)/16GB	Rack (8U)	2/4	P, H, F	S-Fans S-Power	Y	10/100	D,U2	4/2	0/364GB	40X-17X[3]	14/12	6/6

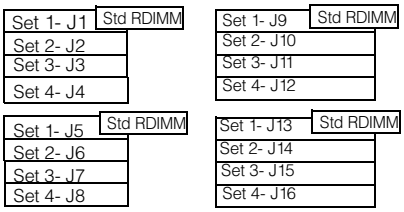
1. Housed in a 19in rack mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "Netfinity 7100 Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III processor with advanced transfer (full speed) L2 cache and 100MHz access to memory and I/O buses.
3. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.

Netfinity 7100 Processor Upgrades

Part Number	Processor Upgrades with Full Speed Cache	SMP Support[1]	Processor Speed Upgrade[2]
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	3xY	1 … 2xY
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	4xY	1 … 3xY
19K4635	xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor	-	1 … 4xY

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

Netfinity 7100 Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory[1]	Quantity of RDIMMs Added[2]				
	64MB (33L3067)	128MB (33L3113)	256MB (33L3115)	512MB (33L3117)[4]	1GB (33L3119)
256MB	4 x 64 RDIMMs Standard	-	-	-	-
512MB	4	-	-	-	-
768MB	-	4	-	-	-
1GB	4	4	-	-	-
1.2GB	-	-	4	-	-
1.7GB	-	4	4	-	-
2GB	4	4	4	-	-
2.7GB	-	4	-	4	-
3GB	4	4	-	4	-
3.2GB	-	-	4	4	-
3.7GB	-	4	4	4	-
4GB[3]	-	8	4	4	-
5GB[3]	-	-	12	4	-
6GB[3]	-	-	8	8	-
7GB[3]	-	-	4	12	-
8GB[3]	-	-	-	16	-
9GB[3]	-	-	4	8	4
10GB[3]	-	-	-	12	4
12GB[3]	-	-	-	8	8
14GB[3]	-	-	-	4	12
16GB[3] (max)	-	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 1GB, order 4 x 33L3067 and 4 x 33L3113.
3. Requires removal of standard memory DIMMs.
4.The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

Part Number	Memory Description[1]	Upgrade 10K2169 Compatible[2]
33L3067	Netfinity 64MB, 100MHz ECC SDRAM RDIMM	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	X
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	X
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM	X[4]
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM	X
33L3147	2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB)	X[4]
10K2169	Netfinity Active PCI/Chipkill Upgrade Kit[3]	-

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Memory must be installed in sets of four identical RDIMMs (example: quantity four of 33L3113). Install RDIMM sets in numerical sequence from Set one to Set four.
2. Memory designated by an "X" may be used with Netfinity Active PCI/Chipkill Upgrade Kit (P/N 10K2169).
3. Netfinity Active PCI/Chipkill™ Upgrade Kit (P/N 10K2169) provides an upgrade to active PCI slots and "Chipkill" ECC memory.
4. Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117.

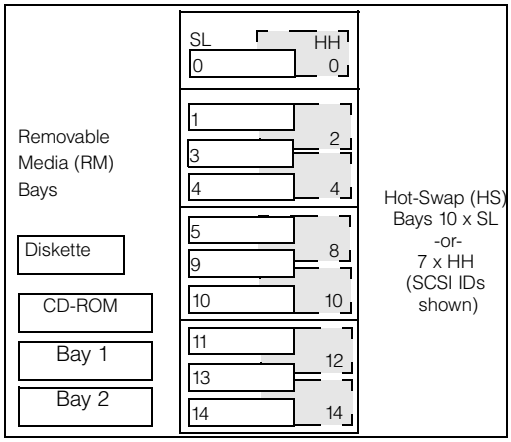
Netfinity 7100 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)[2]	18.2GB (37L7202)[2]	36.4GB (37L7203)[2]	9.1GB (37L7204)[2]	18.2GB (37L7205)[2]	36.4GB (37L7206)[2]	9.1GB (19K0655)[2]	18.2GB (19K0656)[2]
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4	2	1	4	2	1	4	2
45.5GB	5	-	-	5	-	-	5	-
54.6GB	6	3	-	6	3	-	6	3
63.7GB	7	-	-	7	-	-	7	-
72.8GB	8	4	2	8	4	2	8	4
81.9GB	9	-	-	9	-	-	9	-
91GB	10	5	-	10	5	-	10	5
109.2GB	-	6	3	-	6	3	-	6
127.4GB	-	7	-	-	7	-	-	7
145.6GB	-	8	4	-	8	4	-	8
163.8GB	-	9	-	-	9	-	-	9
182GB	-	10	5	-	10	5	-	10
218.4GB	-	-	6	-	-	6	-	-
254.8GB	-	-	7	-	-	7	-	-
291.2GB	-	-	8	-	-	8	-	-
327.6GB	-	-	9	-	-	9	-	-
364GB (max)	-	-	10	-	-	10	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Netfinity 7100 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
RM 1	133mm (5.25in)	HH[1]	Yes	Open
RM 2	133mm (5.25in)	HH[1]	Yes	Open
1 … 10 or 1 … 7	HS	SL or HH[2]	Yes	Open
NB3[3]	19in Rack	3U	Yes	Open

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device.
2. The top bay is HH; all others are configured in groups of three SL bays. When a HH drive is installed in one of these groups, only another HH or a single SL drive can be installed in the same group. For clarity, the SCSI IDs are identified.
3. Tower configured systems support installation of up to three NetBAY3s. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.



Netfinity NetBAY3 (NB3)
(Optional on Tower Configurations)

1. The top bay is HH; all others are configured in groups of three SL bays. When a HH drive is installed in one of these groups, only another HH or a single SL drive can be installed in the same group. For clarity, the SCSI IDs are identified.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 Hard Disk Drives (HDD)[1]					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10

	External Storage Expansion Units[2]	Form Factor
35311RU	EXP300 Storage Expansion Unit[3]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[4]	Rack (3U)
35421RU	FAStT200 Storage Server[5, 6]	Rack (3U)
35422RU	FAStT200 HA Storage Server[5]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. Netfinity 7100 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 bus speeds.
2. Not supported by the onboard external SCSI port. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
3. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
4. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
5. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
6. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

Netfinity 7100 Internal SCSI Cabling

The Netfinity 7100 contains a DASD backplane supporting 10 hot-swap, SCA-2 compliant drive bays. The backplane is connected to Channel B of the integrated dual-channel, Wide Ultra2 SCSI controller through a 16-bit LVD SCSI cable. Channel A only supports external SCSI attachment and is cabled directly to the external 0.8mm VHDCI SCSI connector. To support devices in the internal 133/89mm (5.25/3.5in) half-high bays, a two-drop, 16-bit LVD SCSI cable with integrated terminator is included with the server. This cable can be used to connect to an optional SCSI adapter or, in the case of RAID configurations where the backplane cable is attached to an optional RAID adapter, it can be connected to the Channel B connector.

Netfinity 7100 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6091	ServeRAID-4L Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6080	ServeRAID-4M Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	32/64-bit	1 … 6[7]	X	Universal	33
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32/64-bit	1 … 6	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	3 … 6	-	5	33
	Fiber Storage Controllers and Options[9]						
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 6	X[2]	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-Port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-Port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-	-	-	-
	Networking[11]						
	Ethernet						
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 6[7]	X[2]	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 6[7]	X[2]	Universal	33
09N9901	Netfinity 10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 6[7]	X[2]	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 6[7]	X[2]	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 6	X[2]	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12]	Half	32-bit	1 … 6[7]	X[2]	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X[2]	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X[2]	Universal	33
	Communications[13]						
33L4618	PCI V.90 56 Data/Fax Modem[14]	Half	32-bit	3 … 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters[15]	Half	32-bit	3 … 6	-	5	33
	Systems Management[16]						
01K7209	Netfinity Advanced System Management PCI Adapter[17]	Full	32-bit	3 … 6[18]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[19]	-	-	-	-	-	-
36L9654	Netfinity Advanced System Management Token-RIng Connection[20]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[21]	Full	32-bit	3 … 6[22]	-	5	33
	Other						
10K2169	Netfinity Active PCI/Chipkill Upgrade Kit[2]	-	-	3 … 6	X	-	-

1.The 5V slots support Universal or 5V adapters. The 3.3V slots support 3.3V adapters. A Universal Keyed 66MHz adapter plugged into a 33MHz slot will operate at 33MHz. A Universal Keyed 33MHz adapter plugged into a 66MHz slot limits other adapters installed on the same bus to 33MHz.
2. Netfinity 7100 does not ship with hot-plug PCI slots. The addition of optional Netfinity Active PCI/Chipkill Upgrade Kit (P/N 10K2169) provides slots three through six with hot-plug capability using IBM's Active PCI technology. For Network Operating System support, access www.pc.ibm.com/us/compat.
3. Netfinity 7100 includes a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller with one internal connector and one external port with a 0.8mm Very High Density Connection Interface (VHDCI).
4. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connectors are 0.8mm VHDCI.
5. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
6. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
7. Installation of a 33MHz adapter into a Bus A 66MHz slot will slow operation of all Bus A slots to 33MHz.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. See Netfinity Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
11. Netfinity 7100 includes a full-duplex, 10/100Mbps Ethernet PCI Controller.
12. The Wake on LAN function of this option is not supported by this server.
13. Netfinity 7100 includes two USB ports, two high-speed serial/asynchronous ports, (NS16550A compatible), and one high-speed (up to 2MB/sec data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
14. Due to homologation variances, modem availability may differ by country.
15. See Appendix E for details on Serial I/O Options and configuration limitations.
16. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into Netfinity 7100 works with Netfinity Director to provide significant system management function.

When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. A maximum quantity of one is supported.
19. Required for all xSeries and Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection (Netfinity 5500 models 8660-1 … 4xU are not supported). Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
20. Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter), and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.pc.ibm.com/us/netfinity. Select "Server Support," "Family," "Model," "Downloadable files," and finally "Advanced Systems Management."
21. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.

Slot 1- Bus A- 66MHz- 3.3V or Universal
Slot 2- Bus A- 66MHz- 3.3V or Universal
Slot 3- Bus B- 33MHz- 5V or Universal
Slot 4- Bus B- 33MHz- 5V or Universal
Slot 5- Bus B- 33MHz- 5V or Universal
Slot 6- Bus B- 33MHz- 5V or Universal
All Slots- Full Length, 64-bit

Netfinity 7100 Power, Monitor & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1. Netfinity 7100 includes two 250W hot-swap redundant power supplies with the ability to accept up to two additional 250W Hot-Swap Redundant Power Supplies (P/N 33L3760). Each power supply includes its own 9ft power cord for attachment to a low voltage UPS, PDU or wall outlet. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the Netfinity 7100. Predicting whether a particular configuration will require an additional power supply for redundancy is very complex. However, once the system is installed, the "Non-Redundant LED" will indicate when an additional power supply is required. The following sample configuration is provided as a reference.

Number of Power Supplies	System Configuration Supported
	Typical Non-Redundant Configuration
2	2 x Processors
	3 x PCI Adapters
	4 x Half-High or 5 Slim-Line HDDs
	8 x 512MB RDIMMs
	Typical Redundant Configuration
3[8]	4 x Processors
	6 x PCI Adapters
	7 x Half-High or 10 Slim-Line HDDs
	16 x 512MB RDIMMs
4	**Full Configuration with Redundancy**

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. Netfinity 7100 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. The addition of a DLT tape drive may require a fourth power supply to preserve redundancy.

Part Number	Description
Conversion Kits	
37L6860	8Ux24D Rack-to-Tower Kit[1]
37L6859	8Ux24D Tower-to-Rack Kit
Rack and NetBAY[2]	
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
10L6912	Netfinity NetBAY3[3]
10L6913	Netfinity Caster Set
Keyboard and Mouse[4]	
28L3644	Space Saver II Keyboard[5, 7]
01K1260	TrackPoint IV 104-Key Black Keyboard[6,7]
28L3621	Preferred Keyboard (stealth black)[6]
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3 with casters.
2. Netfinity 7100 rack models are housed in a 19in rack mountable drawer and require one of the racks listed here. Tower models require 8Ux24D Tower-to-Rack Kit (P/N 37L6859) for installation in a rack.
3. Netfinity 7100 tower models require 8Ux24D Rack-to-Tower Kit (P/N 37L6860) for use with a NetBAY3. A maximum of three NetBAY3 enclosures, including the one which ships with the conversion kit, may be stacked beneath a supported Netfinity tower server. Optional NetBAY3s must be shipped separately and not while attached to the base configuration. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.
4. Tower models includes both a mouse and keyboard. Rack models include neither.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
6. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
7. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

Netfinity 7100 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive[1]	1, 2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[2], 3551001[3]
00N7990	40/80GB DLT Internal SCSI Tape Drive[1]	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[2], 3551001[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive[1]	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[2], 3551001[3]
00N8016	100/200GB LTO Tape Drive[1]	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[3]
24P2396	100/200GB LTO Half-High Tape Drive[1]	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[3]
09N4040	20/40GB DLT Internal SCSI Tape Drive[1]	1+2	8	133mm (5.25in) FH	N	Y	3503B0X[2] 3551001[3]
Tape Autoloaders							
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	N/A	-

00N7992	120/240GB DDS/4 Tape Autoloader[1]	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[3]
	External Tape Libraries[4]						
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[5]	-	8, 16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[6]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[7]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[8]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext.	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[3]	-	16 LVD	Int.	Y	N	3551001

Note: Netfinity 7100 includes an external 0.8mm VHDCI connector.

1. Non-RAID Configurations require PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) which contains a five-drop multi-mode terminated LVD SCSI cable. RAID configurations where the hot-swap backplane is cabled to a RAID controller utilize the included two-drop multi-mode terminated LVD SCSI cable ito attach internal tapes to the onboard controller.
2. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
5. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self- termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
6. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
7. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
8. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

Netfinity 7100 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability Application Server

Part Number	Description	Quantity	Usage
8666-41Y	Netfinity 7100 700/2MB Xeon, 256MB(R) ECC, Open, 40X, PCI	1	-
33L3067	Netfinity 64MB, 100MHz ECC SDRAM RDIMM	4	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	-
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4	2GB Total System Memory
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	2	Total of 3 SMP processors
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	6[1]	72GB RAID 5 with Hot-Spare
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1	RAID 1 for NOS, RAID 5 for data

33L3760	250W Hot-Swap Redundant Power Supply	1	Full power redundancy
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	
94G3136	APC Smart-UPS 1400	1	UPS

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB

This tower server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. Configured with enough hard disk drives to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

Server Consolidation

Part Number	Description	Quantity	Usage
8666-31Y	Netfinity 7100 700MHz/1MB Xeon, 256MB(R) ECC, Open, 40X, PCI	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	768MB Total System Memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB RAID 5 with Hot-Spare
37L6080	ServeRAID-4M Ultra160 SCSI Controller	1	RAID 1 for NOS, RAID 5 for data
06P3601	10/100 Ethernet Server Adapter	2	Total of 3 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
33L3760	250W Hot-Swap Redundant Power Supply	1	Full Power Redundancy
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	-
94G3136	APC Smart-UPS 1400	1	UPS

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This tower model is configured to meet the need of server consolidation. Many businesses are trying to get their arms around the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers onto one platform there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the Netfinity 7100 is designed for high availability. This configuration includes 109GB of internal HDD storage, features a third power supply which provides fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 80GB per tape--in addition to all the standard features of the Netfinity 7100.

IBM Netfinity 7600

Part Number	Processor Speed (MHz)[2]	Number of Processors (Std/Max)	L2 ECC Cache	Memory (Std/Max) (R = RDIMM)[3]	Form Factor	Power Supply Quantity (Std/Max)	Hot-Swap (Power, Slots, HDD, Fans)	Redundancy (Optional, Standard)	Adv System Management Processor	Onboard Ethernet (Mbps)	SCSI Controller (Dual, Ultra, RAID)	Removable Media Bays (Total/Avail)	Internal Hard Disk Drive (Std/Max)	CD-ROM (IDE)	Bays (Total/Avail)	Slots (Total/Avail)
8665-4RY[1]	700	1/4	1MB	512MB(R) / 16GB	Rack (8U)	3/4	P, S, H, F	S-Fans S-Power[4]	Y	10/100	D,U2, R[6]	4/2	0 / 364GB	40X-17[5]	14/12	6/5
8665-5RY[1]	700	1/4	2MB	512MB(R) / 16GB	Rack (8U)	3/4	P, S, H, F	S-Fans S-Power[4]	Y	10/100	D,U2, R[6]	4/2	0 / 364GB	40X-17[5]	14/12	6/5

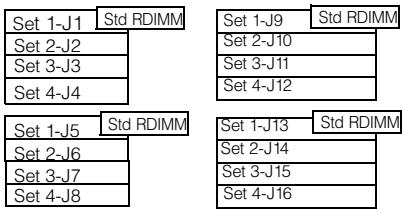
1. Housed in a 19in rack-mountable drawer and ships standard without a keyboard or mouse. See "Rack and NetBAY" under "Netfinity 7600 Power, Monitor & Accessories" for supported IBM racks.
2. Intel Pentium III Xeon processor with advanced transfer (full speed) L2 cache and 100MHz access to memory and I/O buses.
3. Advanced Chipkill ECC memory corrects two-, three-, and four-bit memory errors.
4. Robust configurations may require optional 250W Hot-Swap Redundant Power Supply (P/N 33L3760) for redundancy. See "Power" under Netfinity 7600 Power, Monitor & Accessories" for additional information.
5. Variable read rate. Actual playback speed will vary and is often less than the maximum possible.
6. RAID adapter is equivalent to ServeRAID-4M Ultra160 SCSI Controller (P/N 37L6080).

Netfinity 7600 Processor Upgrades

Part Number	Processor Upgrades with Full Speed Cache	SMP Support[1]	Processor Speed Upgrade[2]
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	4RY	1RY, 2RY
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	3RY, 5RY	1RY, 2RY, 4RY
19K4635	xSeries 250 900MHz/2MB Upgrade with Pentium III Xeon Processor	-	1 ,,, 5RY

1. Three additional processors may be installed, providing a maximum of four. All processors must be identical in type, speed, and cache size.
2. Requires removal of the standard processor. A maximum of four processors may be installed. All processors must be identical in type, speed and cache size. Upgrades may require a BIOS update. To obtain the latest Flash BIOS, access www.pc.ibm.com/support and enter machine "Type-Model" in Quick Path. Select "Downloadable files" then "BIOS."

Netfinity 7600 Memory



All RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Install RDIMM sets in numerical sequence from one to four.

Total Memory[1]	Quantity of RDIMMs Added[2]			
	128MB (33L3113)	256MB (33L3115)	512MB (33L3117)[4]	1GB (33L3119)
512MB	4 x 128 RDIMMs standard	-	-	-
1GB	4	-	-	-
1.5GB	-	4	-	-
2GB	4	4	-	-
2.5GB	-	8	-	-
3GB	4	-	4	-
4GB	4	4	4	-
5GB	4	-	8	-
6GB[3]	-	8	8	-
7GB[3]	-	4	12	-
8GB[3]	-	-	16	-
9GB	4	-	-	8
10GB[3]	-	-	12	4
12GB[3]	-	-	8	8
14GB[3]	-	-	4	12
16GB[3] (max)	-	-	-	16

This table does not represent all possible memory configurations. Memory modules may vary in price per MB. Selection of smaller RDIMMs may provide a more cost-effective alternative to using larger RDIMMs.
1. Network Operating Systems may limit the maximum amount of addressable memory. See operating system specifications for further information.
2. To obtain the Quantity of memory identified in the "Total Memory" column, select the appropriate row and order the quantity of RDIMMs identified in all columns for that row. Example: For 2GB, order 4 x 33L3113 plus 4 x 33l3115.
3. Requires removal of standard RDIMMs.
4. The 2GB memory option (P/N 33L3147), each of which includes four 512MB RDIMMs, can be substituted for a quantity of four 512MB (P/N 33L3117) RDIMMs.

Part Number	Memory Description[1]
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM[2]
33L3119	Netfinity 1GB 100MHz ECC SDRAM RDIMM
33L3147	2GB 100MHz ECC SDRAM RDIMM Kit (4 x 512MB)[2]

1. Due to four-way interleaving all RDIMMs installed in each set must be the same size, but all the sets do not have to contain RDIMMs of the same size. Memory must be installed in sets of four identical RDIMMs (example: quantity four of 33L3113). Install RDIMM sets in numerical sequence from Set 1 to Set 4. Chipkill support is provided on the memory card.
2. Due to the new technology used by the 512MB RDIMMs contained in P/N 33L3147, they should not be mixed within a set with Netfinity 512MB 100MHz ECC SDRAM RDIMM (P/N 33L3117).

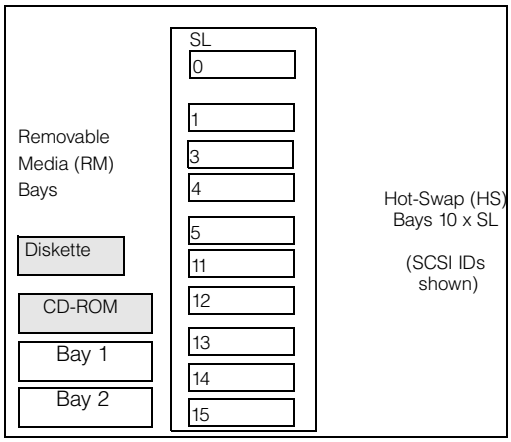
Netfinity 7600 Hard Disk Drive (HDD) Storage

Total Int Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)[2]	18.2GB (37L7202)[2]	36.4GB (37L7203)[2]	9.1GB (37L7204)[2]	18.2GB (37L7205)[2]	36.4GB (37L7206)[2]	9.1GB (19K0655)[2]	18.2GB (19K0656)[2]
0GB	Standard on base models							
9.1GB	1	-	-	1	-	-	1	-
18.2GB	2	1	-	2	1	-	2	1
27.3GB	3	-	-	3	-	-	3	-
36.4GB	4	2	1	4	2	1	4	2
45.5GB	5	-	-	5	-	-	5	-
54.6GB	6	3	-	6	3	-	6	3
63.7GB	7	-	-	7	-	-	7	-
72.8GB	8	4	2	8	4	2	8	4
81.9GB	9	-	-	9	-	-	9	-
91GB	10	5	-	10	5	-	10	5
109.2GB	-	6	3	-	6	3	-	6
127.4GB	-	7	-	-	7	-	-	7
145.6GB	-	8	4	-	8	4	-	8
163.8GB	-	9	-	-	9	-	-	9
182GB	-	10	5	-	10	5	-	10
218.4GB	-	-	6	-	-	6	-	-
254.8GB	-	-	7	-	-	7	-	-
291.2GB	-	-	8	-	-	8	-	-
327.6GB	-	-	9	-	-	9	-	-
364GB (max)	-	-	10	-	-	10	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. Netfinity 7600 contains an Ultra2 hot-swap backplane which limits Ultra160 HDDs to Ultra2 speeds.

Bay	Form Factor	Height	Front Access	Usage
-	89mm (3.5in)	SL	Yes	Diskette
-	133mm (5.25in)	HH	Yes	IDE CD-ROM
RM 1	133mm (5.25in)	HH[1]	Yes	Open
RM 2	133mm (5.25in)	HH[1]	Yes	Open
1 … 10	HS	SL	Yes	Open
NB3[2]	19in Rack	3U	Yes	Open

1. Two half-high (HH) bays can be combined to support a single full-high (FH) device
2. Tower configured systems support installation of up to three NetBAY3s. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.



Netfinity NetBAY3 (NB3)
(Optional on Tower Configurations)

All bays are SL. Bus A includes the top five bays supported by the standard integrated Ultra2 SCSI controller connected by a standard 16-bit LVDS cable. Bus B includes the lower five bays. For clarity, the SCSI IDs are identified.

Part Number	Description	RPM	Height	Bays Supported	Max Qty
Ultra160 HDDs[1]					
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	See diagram	10
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	See diagram	10
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15,000	SL	See diagram	10

	External Storage Expansion Units[2, 3]	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-
35601RU	FAStT EXP500 Storage Expansion Unit[5]	Rack (3U)
35421RU	FAStT200 Storage Server[6, 7]	Rack (3U)
35422RU	FAStT200 HA Storage Server[6]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. Netfinity 7600 contains an Ultra2 hot-swap, split backplane which supports Ultra160 HDDs at Ultra2 bus speeds when connected to the standard integrated storage controller. Ultra160 bus speeds are supported with the addition of an optional Ultra160 storage controller.
2. Not supported by the onboard external SCSI connector. Includes a single ServeRAID-4M, one channel of which is attached to the internal hot-swap backplane. Remaining channels are available for external usage according to option specifications.
3. To configure a SCSI storage device, select an optional SCSI controller then refer to Appendix D: Cables - Storage Units - Controllers to confirm the controller supports the desired External Storage Expansion Unit and to select a supported cable. For HDD or other expansion unit options, see the specific expansion unit section. For Fibre Channel storage devices, refer to the Fibre Array Solutions section.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W power supplies, each with its own power cord. To convert an EXP300 to a tower form factor, Netfinity EXP300 Rack-to-Tower Conversion Kit (P/N 09N7296) is required.
5. FAStT EXP500 Storage Expansion Unit (P/N 35601RU) includes dual hot-swap 350W power supplies, each with its own power cord.
6. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
7. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

Netfinity 7600 Internal SCSI Cabling

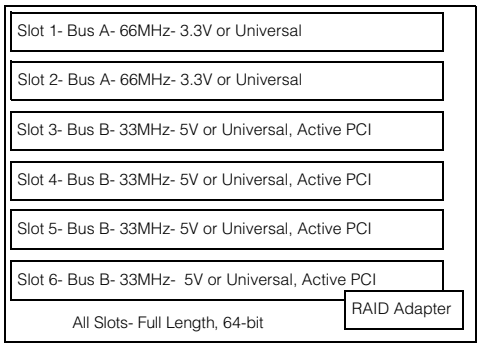
The Netfinity 7600 contains a DASD backplane supporting 10 hot-swap, SCA-2 compliant drive bays. The backplane is connected to the internal connector of a standard ServeRAID adapter through a 16-bit LVD SCSI cable. Models 8665-1 … 3RY contain a ServeRAID-3HB. All other models contain a ServeRAID-4M. External RAID support is provided through the two external 0.8mm VHDCI connectors on the back of the adapter. Models using ServeRAID-4M for internal RAID may only utilize one of the external ports. To support SCSI devices in the internal 133/89mm (5.25/3.5in) half-high bays, a two-drop, 16-bit LVD SCSI cable with integrated terminator is included with the server. This cable can be used to connect Channel B of the integrated Wide Ultra2 SCSI controller to SCSI devices in one or both of the removable media bays. Channel A of the dual-channel, Wide Ultra2 SCSI controller only supports external SCSI attachment and is cabled directly to an external 0.8mm VHDCI SCSI connector.

Netfinity 7600 I/O Options

Part Number	Description	Adapter Length	PCI Support	Slots Supported[1]	Hot-Plug[2]	PCI Voltage Key	MHz
	Storage Controllers[3]						
37L6080	ServeRAID-4M Ultra160 SCSI Controller[4]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6091	ServeRAID-4L Ultra160 SCSI Controller[5]	Full	32/64-bit	1 … 6[7]	X	Universal	33
37L6889	ServeRAID-4H Ultra160 SCSI Controller[6]	Full	32/64-bit	1 … 6[7]	X	Universal	33
19K4646	PCI Wide Ultra160 SCSI Adapter[8]	Half	32/64-bit	1 … 6	-	Universal	66
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Half	32-bit	3 … 6	-	5	33
	Fiber Storage Controllers and Options[9]						
00N6881	Netfinity FAStT Host Adapter	Half	32/64-bit	1 … 6	X	Universal	66
35521RU	FAStT500 Storage Server	-	-	-	-	-	-
35421RU	FAStT200 Storage Server	-	-	-	-	-	-
35422RU	FAStT200 HA Storage Server	-	-	-	-	-	-
35341RU	SAN Fibre Channel Managed Hub	-	-	-	-	-	-
2109S08	SAN Fibre Channel Switch, 8-port	-	-	-	-	-	-
2109S16	SAN Fibre Channel Switch, 16-port	-	-	-	-	-	-
2108R3L	SAN Data Gateway Router Ultra SCSI LVD Port[10]	-	-	-	-	-	-
	Networking[11]						
	Ethernet						
09N9901	10/100 EtherLink Server Adapter by 3Com	Half	32-bit	1 … 6[7]	X	Universal	33
34L4601	Netfinity 10/100 Ethernet Security Adapter	Half	32/64-bit	1 … 6[7]	X	Universal	33
19K4401	Netfinity Gigabit Ethernet Adapter (copper)	Half	32/64-bit	1 … 6[7]	X	Universal	33
06P3601	10/100 Ethernet Server Adapter	Half	32-bit	1 … 6[7]	X	Universal	33
06P3701	Gigabit Ethernet SX Server Adapter (fiber)	Half	32/64-bit	1 … 6	X	Universal	66
	Token Ring						
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN[12]	Half	32-bit	1 … 6[7]	X	Universal	33
34L5001	16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X	Universal	33
34L5201	High-Speed 100/16/4 Token-Ring PCI Management Adapter[12]	Half	32-bit	1 … 6[7]	X	Universal	33
	Communications[13]						
33L4618	PCI V.90 56 Data/Fax Modem[14]	Half	32-bit	3 … 6	-	5	33
37L14xx	Serial I/O SST 8, 16, and 128 port adapters[15]	Half	32-bit	3 … 6	-	5	33
	Systems Management[16]						
01K7209	Netfinity Advanced System Management PCI Adapter[17]	Full	32-bit	3 … 6[20]	-	5	33
03K9309	Netfinity Advanced System Management Interconnect Cable Kit[18]	-	-	-	-	-	-
36L9654	Netfinity Advanced System Management Token-RIng Connection[19]	-	-	-	-	-	-
	Host Attach						
9086001	Netfinity ESCON Adapter[21]	Full	32-bit	3 … 6[22]	-	5	33

1. The 5V slots support Universal or 5V adapters. The 3.3V slots support universal or 3.3V adapters. A Universal keyed 66MHz adapter plugged into a 33MHz slot will operate at 33MHz. A Universal keyed 33MHz adapter plugged into a 66MHz slot limits other adapters installed on the same bus to 33MHz.
2. Slots three through six include hot-plug capability using IBM's Active PCI technology. For Network Operating System support access www.pc.ibm.com/us/compat.
3. Models 8665-1 … 3xY include a single ServeRAID-3HB. Models 4xY and above include a single ServeRAID-4M. One channel of these adapters is attached to the internal hot-swap backplane. Remaining channels are available for external usage just as the option would be. All models include a dual-port, dual-channel, 64-bit Wide Ultra2 SCSI controller with one internal connector and one external port with a 0.8mm Very High Density Connection Interface (VHDCI).
4. ServeRAID-4M Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides two channels, 64MB of battery-backed ECC cache and two internal and two external Ultra160 connectors (only two connectors may be utilized). External connectors are 0.8mm VHDCI.
5. ServeRAID-4L Ultra160 SCSI Controller is powered by a 100MHz Intel i960 processor and provides a single channel, 16MB of ECC cache and either one internal or one external Ultra160 connection. External connector is 0.8mm VHDCI.
6. ServeRAID-4H Ultra160 SCSI Controller is powered by a 266MHz PowerPC 750 processor and provides 128MB of battery-backed ECC cache with two internal and up to four external Ultra160 connectors (only four connectors may be utilized). External connectors are 0.8mm VHDCI.
7. Installation of a 33MHz adapter into a Bus A 66MHz slot will slow operation of all Bus A slots to 33MHz.
8. PCI Wide Ultra160 SCSI Adapter (P/N 19K4646) provides a single channel with one internal connector and a five-drop multi-mode terminated LVD SCSI cable and one external connector with a 0.8mm VHDCI connector. Only one of the two connectors may be utilized.
9. See Netfinity Fibre Array Solutions section for additional configuration information.
10. The 2108R3L SAN Data Gateway Router Ultra SCSI LVD port replaces both the Single-ended and Differential SAN Data Gateway Routers (P/N 2108R3D and 2108R3S).
11. Netfinity 7600 includes a full-duplex, 10/100Mbps Ethernet PCI Controller.
12. The Wake-on LAN function of this option is not supported by this server.

13. Netfinity 7600 includes two USB ports, two high-speed serial/asynchronous ports (NS16550A compatible), and one high-speed (up to 2MB/sec. data transfer speed) bidirectional parallel port supporting devices using ECP/EPP/SSP protocols adhering to the IEEE 1284 standard.
14. Due to homologation variances, modem availability may differ by country.
15. See Appendix E for details on Serial I/O Options and configuration limitations.
16. The Netfinity Advanced Systems Management Processor and Interconnect Bus integrated into Netfinity 7600 works with Netfinity Director to provide significant system management function. When used with optional Netfinity Advanced System Management PCI Adapter (P/N 01K7209) and Netfinity Advanced System Management Interconnect Cable Kit (P/N 03K9309) additional management and control of up to 12 service processors from a remote console through a single modem or LAN connection is possible.
17. Includes PCI adapter, Netfinity Advanced System Management Interconnect Cable Kit components and 56W AC adapter which requires a separate power source. Provides an integrated 10/100 Ethernet port and PCMCIA slot to support optional Netfinity Advanced System Management Token-Ring Connection (P/N 36L9654).
18. Required for all Netfinity servers containing a standard Advanced System Management Processor that are to be interconnected for system management support through a LAN or modem connection (Netfinity 5500 models 8660-1 … 4xU are not supported). Up to 12 service processors may be interconnected (including standard and optional processors) with an aggregate connection length of no more than 91.4m (300ft). A customer-supplied Ethernet cable is required for each interconnection.
19.Contains an IBM Turbo 16/4 Token-Ring PCI Card, which installs in the PCMCIA card slot of Netfinity Advanced System Management PCI Adapter, and a PC Card to 9-pin D-Shell cable which is routed to a rear chassis cut-out. The Netfinity Advanced System Management PCI Adapter's integrated Ethernet port and Netfinity Advanced System Management Token-Ring Connection cannot be connected or used together. To download the latest firmware, access www.pc.ibm.com/us/netfinity. Select "Server Support," "Family," "Model," "Downloadable files," and finally "Advanced Systems Management."
20. A maximum quantity of one is supported.
21. Provides an ESCON MIC and a DB9 Serial Port. Cables are not included but are available through S/390 channels. Contact your IBM representative for additional information.
22. A maximum of two 9086001 adapters (installed in nonadjacent slots) are supported in a single server.


Slot 1- Bus A- 66MHz- 3.3V or Universal
Slot 2- Bus A- 66MHz- 3.3V or Universal
Slot 3- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 4- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 5- Bus B- 33MHz- 5V or Universal, Active PCI
Slot 6- Bus B- 33MHz- 5V or Universal, Active PCI
RAID Adapter
All Slots- Full Length, 64-bit

Netfinity 7600 Power, Monitor & Accessories

Part Number	Description
	Power[1]
33L3760	250W Hot-Swap Redundant Power Supply
	Uninterruptible Power Supply (UPS)[2]
94G3135	APC Smart-UPS 1000
94G3136	APC Smart-UPS 1400
94G6674	APC Smart-UPS 1400RMB[3]
94G6676	APC Smart-UPS 3000RMB[3]
37L6861	APC Smart-UPS 5000RMB[4]
	Monitors[5]
633347N	E51 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6331N2N	E54 Color Monitor 15in (350mm, 13.8in Viewable Image Size), stealth black[6]
6332J1N	E74 Color Monitor 17in (403mm, 15.9in Viewable Image Size), stealth black[6]
66274AN	G78 Color Monitor 17in (454mm, 17.9in Viewable Image Size), stealth black[6]
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable), stealth black[7]

1. Netfinity 7600 includes three 250W hot-swap redundant power supplies, with the ability to accept one additional 250W Hot-Swap Redundant Power Supply (P/N 33L3760). Each power supply includes its own 9ft power cord for attachment to a low voltage UPS, PDU or wall outlet. To assist in determining when an additional power supply is required to preserve redundancy, a "Non-Redundant LED" is a standard feature of the Netfinity 7600. Predicting whether a particular configuration will require an additional power supply for redundancy is very complex. However, once the system is installed, the "Non-Redundant LED" will indicate when an additional power supply is required. The following sample configuration is provided as a reference.

Number of Power Supplies	System Configuration Supported
3[8]	**Typical Redundant Configuration**
	4 x Processors
	6 x PCI Adapters
	7 x Half-High or 10 x Slim-Line HDDs
	16 x 512MB RDIMMs
4	**Full Configuration with Redundancy**

2. For runtimes and UPS attributes see Appendix C: UPS Runtime Estimate.
3. Height is 3U. See "Rack and NetBAY" for supported IBM racks.
4. Height is 5U. See "Rack and NetBAY" for supported IBM racks.
5. xSeries 250 uses an SVGA controller (S3 Trio 3D chipset) with 4MB of video memory.
6. Installation within a rack requires optional Monitor Compartment (P/N 94G7444).
7. Installation within a rack requires optional Netfinity Flat Panel Monitor Rack Mount Kit II (P/N 37L6888) and Netfinity Rack Keyboard Tray (P/N 28L4707). A space saver keyboard may coexist within the same 28L4707 keyboard tray.
8. The addition of a DLT tape drive may require a fourth power supply to preserve redundancy.

Part Number	Description
	Conversion Kits
37L6860	8Ux24D Rack-to-Tower Kit[1]
	Rack and NetBAY[2]
930842P	Netfinity Enterprise Rack
930842X	Netfinity Enterprise Expansion Cabinet
9306900	Netfinity Rack
9306910	Netfinity Rack (includes perforated front door)
9306200	Netfinity NetBAY22
10L6912	Netfinity NetBAY3[3]
	Keyboard and Mouse[4]
28L3644	Space Saver II Keyboard[5, 7]
01K1260	TrackPoint IV 104-Key Black Keyboard[6,7]
28L3621	Preferred Keyboard (stealth black)[6]
28L3673	Sleek 2-Button Stealth Black Mouse

1. Includes one Netfinity NetBAY3 with casters.
2. Netfinity 7600 rack models are housed in a 19in rack mountable drawer and require one of the racks listed here. See Rack Cabinet and Options section for IBM rack supported devices.
3. Netfinity 7600 requires 8Ux24D Rack-to-Tower Kit (P/N 37L6860) for use with a NetBAY3. A maximum of three NetBAY3 enclosures, including the one which ships with the conversion kit, may be stacked beneath a supported Netfinity tower server. Optional NetBAY3s must be shipped separately and not while attached to the base configuration. See IBM Netfinity NetBAY3 Stackable Enclosure section for supported devices.
4. Netfinity 7600 ships without a keyboard or mouse.
5. Installation within a rack requires optional keyboard tray (P/N 28L4707) (stows in ready-to-use position).
6. Installation within a rack requires optional keyboard tray (P/N 28L4707). This keyboard cannot share a keyboard tray with a flat panel display.
7. Advanced TrackPoint IV features are not available on IBM Netfinity systems.

Netfinity 7600 Tape Options

Part Number	Tape Drives	Bays Supported	SCSI Interface (bit)	Form Factor	Termination Included	68/50-pin Converter Incl	Ext Tape Enclosures
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	1, 2	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
00N7990	40/80GB DLT Internal SCSI Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3503B0X[2], 3551001[1]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3510020[2], 3551001[1]
09N4040	20/40GB DLT Internal SCSI Tape Drive	1+2	8	133mm (5.25in) FH	N	Y	3503B0X[2] 3551001
00N8016	100/200GB LTO Tape Drive	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
24P2396	100/200GB LTO Half-High Tape Drive	1, 2	16 Ultra2 LVD	133mm (5.25in) HH	N	N/A	3551001[1]
	Tape Autoloaders						
3502108	DLT Tape Autoloader	N/A	16	Desktop	Y	N/A	-
00N7992	120/240GB DOS/4 Tape Autoloader	1+2	16 Ultra2 LVD	133mm (5.25in) FH	N	N/A	3551001[1]
	External Tape Libraries[3]						
3502x14	DLT Tape Library	-	16	Desktop or Rack	Y	-	-
3570C2X	Magstar MP 3570 Tape Subsystem	-	Diff	6U Rack	Y	N/A	-
	External Tape Enclosures						
3510020	External Half High SCSI Storage Enclosure[4]	-	8, 16	Desktop	N	N	-
3503B0X	DLT External SCSI Enclosure[5]		16	Desktop	N	N	-
3551001	NetMEDIA Storage Expansion Unit EL[6]	-	16	Rack	Y	N	-
10L7113	NetMEDIA Systems Management Adapter[7]	-	16 LVD	-	N	N	3551001
	Associated Options						
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	-	16 LVD/SE	Ext	Y	N	3510020, 3503B0X
10K2340	Media BayTray and LVD Cable Kit[1]	-	16 LVD	Int	Y	N	3551001

Note: Netfinity 7600 includes a two-drop multimode terminated LVD SCSI cable, an available internal Ultra2 SCSI port and an external Ultra2 0.8mm VHDCI connector.

1. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop mult-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
2. Requires 68-pin External Multimode LVD/SE SCSI terminator (P/N 00N7956).
3. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
4. Provides a black desktop 133mm (5.25in) half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
5. Provides a black desktop DLT tape enclosure with a 68-pin high density external connector. Requires termination by the tape drive or by installation of an External Multimode LVD/SE SCSI terminator (P/N 00N7956).
6. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full-high (FH) or four half-high (HH) extended length 133mm (5.25in) bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
7. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12m when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.

Note: Additional tape attributes can be found in Appendix A: Tape Drive Attributes.

Netfinity 7600 Sample Configurations

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.

High Availability Application Server

Part Number	Description	Quantity	Usage
8665-5RY	Netfinity 7600 700/2MB Xeon, 512MB(R) ECC, RAID, Open, 40X, PCI (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	-
33L3115	Netfinity 256MB, 100MHz ECC SDRAM RDIMM	4	-
33L3117	Netfinity 512MB, 100MHz ECC SDRAM RDIMM	4	4GB Total System Memory
10K2332	Netfinity 700MHz/2MB Upgrade II with Pentium III Xeon Processor	3	Total of 4 SMP processors
37L7201	9.1GB Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	6[1]	72GB RAID 5 with Hot-Spare
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
33L3760	250W Hot-Swap Redundant Power Supply	1	Full Power Redundancy
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	
28L3644	Space Saver II Keyboard	1	-
94G6674	APC Smart-UPS 1400RMB	1	-
External Storage			
35311RU	EXP300 Storage Expansion Unit	1	Includes 2M Ultra2 cable
37L7206	36.4GB 10K-4 Wide Ultra160 SCSI Hot-Swap SL HDD	14	RAID 5 Data Storage with Hot-Spare
Rack			
9306200	Netfinity NetBAY22	1	
09N4290	NetBAY 1x4 Console Switch	1	
94G6667	Power Cable - Type A14	1	
94G7447	NetBAY Console Cable Set-12ft	1	
94G6670	Blank Filler Panel Kit	1	

1. Six HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is four HDDs or 72.8GB

This rack server is configured to act as the foundation for business critical applications, applications your business cannot afford to be without. Configured with enough HDDs to mirror the operating system and provide a standard RAID 5 environment for data, optional hot-swap redundant power and UPS for power even during a blackout, this server represents the leading edge in high availability. An internal tape drive is included to back up that all important asset--data. A modem could be included to allow out-of-band (non-LAN) system management utilizing the integrated Netfinity Advanced System Management Processor.

Server Consolidation

Part Number	Description	Quantity	Usage
8665-4RY	Netfinity 7600 700/1MB Xeon, 512MB(R) ECC, RAID, Open, 40X, PCI (Rack 8U)	1	-
33L3113	Netfinity 128MB, 100MHz ECC SDRAM RDIMM	4	1GB Total System Memory
10K2331	Netfinity 700MHz/1MB Upgrade II with Pentium III Xeon Processor	1	Total of 2 SMP processors
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	9.1GB mirrored for NOS
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	8[1]	109GB RAID 5 with Hot-Spare
06P3601	10/100 Ethernet Server Adapter	3	Total of 4 Ethernet connections
00N7990	40/80GB DLT Internal SCSI Tape Drive	1	-
66274AN	G78 Color Monitor 17in (406.4mm, 16in Viewable Image Size), stealth black	1	
28L3644	Space Saver II Keyboard	1	-
94G6674	APC Smart-UPS 1400RMB	1	-
Rack			
9306200	Netfinity NetBAY22	1	-
09N4290	NetBAY 1x4 Console Switch	1	-
94G6667	Power Cable - Type A14	1	Attaches to monitor
94G7447	NetBAYConsole Cable Set 12ft	1	-
94G6670	Blank Filler Panel Kit	2	-

1. Eight HDDs are used for RAID 5 protection. One HDD is identified as a hot-spare. Effective capacity is six HDDs or 109.2GB

This rack server is configured to meet the need of server consolidation. Many businesses are trying to achieve better control of the dispersed departmental servers that have grown up around the enterprise. By moving multiple servers on to one platform, there is only one system to manage both hardware and software. There is potentially less expense for service, software licenses, etc., and there is less concern about single points of failure because the Netfinity 7600 is designed for high availability. This configuration includes 109GB of internal HDD storage, features three power supplies which provide fully redundant power, a UPS to help protect the system against a momentary electricity loss, and an internal tape drive that backs up as much as 80GB per tape--in addition to all the standard features of the Netfinity 7600.

IBM External Storage Expansion Unit Overview

Part Number	Subsystem Type	Total Bays	Hot-Swap Bays (total/avail)	Maximum Storage Capacity (GB)	Dimensions (W x D x H)	Form Factor	Max Cfg Wt	Power Supply
IBM External Storage Expansion At-A-Glance								
35421RU FAStT200	Fibre Channel	10	10/10	364	480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in)	Rack Drawer (3U)	42.3kg (94.0lbs)	Redundant 350W
35422RU FAStT200 HA[5]	Fibre Channel	10	10/10	364	480mm x 575mm x 131.8mm (18.9in x 22.63in x 5.2in)	Rack Drawer (3U)	42.3kg (94.0lbs)	Redundant 350W
35311RU EXP300	Ultra160 LVDS	14	14/14[3]	509.6	444mm x 519mm x 127.5mm (17.5in x 20.4in x 5.0in)	Rack Drawer (3U)[1]	34.5kg (76.1lbs)	Redundant 500W
35601RU FAStT EXP500	Fibre Channel[4]	10	10/10	364	447mm x 56mm x 128mm (17.6in x 22.2in x 5.0in)	Rack Drawer (3U)	36.1kg (79.6lbs)	Redundant 350W

To attach a Storage Enclosure to an IBM xSeries or Netfinity server, the following is required:
* Attachment to an appropriate SCSI controller.
* External Cable(s) - See Appendix D: Cables - Storage Units - Controllers.

1. A rack-to-tower conversion kit option is available.
2. Supports the use of slim-line drives only.
3. Attachment to a FAStT500 Storage Server (P/N 35521RU) is required for this device to function. See FAStT EXP500 Configurator section for more information.
4. Identical to FAStT200 (P/N 35421RU) with the addition of a second FAStT200 Failsafe RAID Controller.

FAStT200 Storage Server (3542xRU)

FAStT200 (HA) Storage Expansion Unit

Total Internal Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB[2] (19K0652)	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard on base models			
18.2GB	1	-	-	1
36.4GB	2	1	-	2
54.6GB	3	-	-	3
72.8GB	4	2	-	4
73.4GB	-	-	1	-
91.0GB	5	-	-	5
109.2GB	6	3	-	6
145.6GB	8	4	-	8
146.8GB	-	-	2	-
182.0GB	10	5	-	10
218.4GB	-	6	-	-
220.2GB	-	-	3	-
254.8GB	-	7	-	-
291.2GB	-	8	-	-
293.6GB	-	-	4	-
327.6GB	-	9	-	-
364.0GB	-	10	-	-
367.0GB	-	-	5	-
440.4GB	-	-	6	-
513.8GB	-	-	7	-
587.2GB	-	-	8	-
660.6GB	-	-	9	-
734.0GB (max)	-	-	10	-

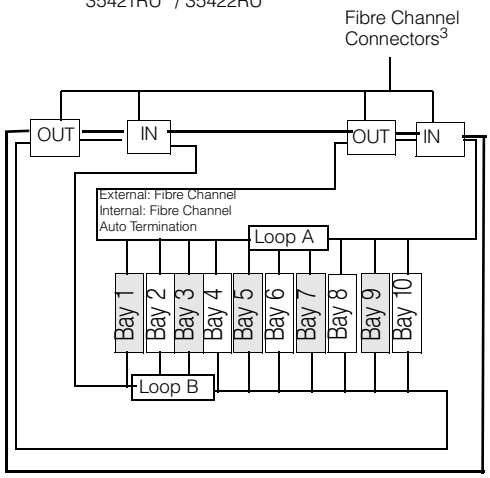
This table does not represent all valid HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.
2. When referring to hard disk drive capacity, GB equals one billion bytes. Total user accessible capacity may vary depending on operating environments.

Part Number	Description	RPM	Height	Bays Supported	Max Qty Supported
19K0652	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
19K0654	Netfinity 73.4GB 10K-4 FC Hot-Swap HDD	10,000	HH	1 … 10	10
06P5707	Netfinity 18.2GB 15K-rpm FC Hot-Swap HDD	15,000	SL	1 … 10	10

External Storage Expansion Units		Form Factor
35421RU	FAStT200 Storage Server[1, 2]	Rack (3U)
35422RU	FAStT200 HA Storage Server[1]	Rack (3U)
19K1121	FAStT200 Redundant RAID Controller	-

1. The FAStT200 includes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.
2. Can be upgraded to FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).

FAStT200 Storage Server[1]
35421RU[2] / 35422RU



1. Housed in a 19in rack-mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources.
Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm) or NetBAY3/3E.
Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. 35421RU includes a single loop only. The second loop is created with the addition of FAStT200 Redundant RAID Controller (P/N 19K1121).
3. GBICs are not included. Either Fibre Channel long-wave GBICs (P/N 03K9307 or short-wave (P/N 03K9308) GBICs may be used.

IBM EXP300 (35311RU)

EXP300 Hard Disk Drive (HDD) Storage

Total Int. Storage[1]	7200RPM HDDs			10,000RPM HDDs			15,000RPM HDDs	
	9.1GB (37L7201)	18.2GB (37L7202)	36.4GB (37L7203)	9.1GB (37L7204)	18.2GB (37L7205)	36.4GB (37L7206)	9.1GB (19K0655)	18.2GB (19K0656)
0GB	Standard on base models							
18.2GB	2	1	-	2	1	-	2	1
36.4GB	4	2	1	4	2	1	4	2
54.6GB	6	3	-	6	3	-	6	3
72.8GB	8	4	2	8	4	2	8	4
91GB	10	5	-	10	5	-	10	5
109.2GB	12	6	3	12	6	3	12	6
127.4GB	14	7	-	14	7	-	14	7
145.6GB	-	8	4	-	8	4	-	8
182GB	-	10	5	-	10	5	-	10
218.4GB	-	12	6	-	12	6	-	12
254.8GB	-	14	7	-	14	7	-	14
291.2GB	-	-	8	-	-	8	-	-
364.0GB	-	-	10	-	-	10	-	-
436.8GB	-	-	12	-	-	12	-	-
509.6GB (max)	-	-	14	-	-	14	-	-

This table does not represent all possible HDD configurations.
1. Select a total storage row then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

SCSI ID	Form Factor	Height	Front Access	Usage
0 … 6	HS	SL	Yes	open
8 … 14	HS	SL	Yes	open

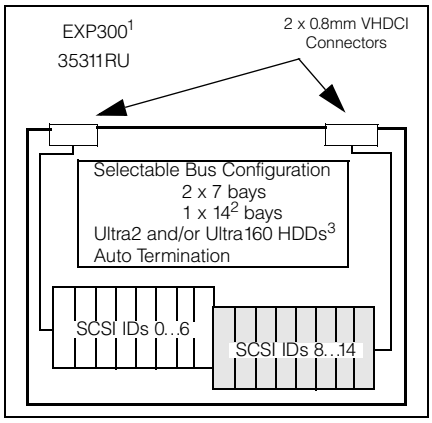
	Maximum MB/s	
Cable Length (Meters)	Ultra2 Controller	Ultra160 Controller
2	80	160
4.2	80	160

1. The EXP300 ships with a single Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).

Part Number	Description	RPM	Height	Bays Supported[1]	Max Qty
	Ultra 160 HDDs[2]				
37L7201	9.1GB Wide Ultra2 SCSI Hot-Swap SL HDD	7200	SL	1 … 14	14[3]
37L7202	18.2GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 14	14[3]
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	7200	SL	1 … 14	14[3]
37L7204	9.1GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 14	14[3]
37L7205	18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 14	14[3]
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	10,000	SL	1 … 14	14[3]
19K0655	9.1GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 14	14[3]
19K0656	18.2GB 15Krpm Ultra160 SCSI Hot-Swap HDD	15000	SL	1 … 14	14[3]

	External Storage Expansion Units	Form Factor
35311RU	EXP300 Storage Expansion Unit[4]	Rack (3U)
09N7296	EXP300 Rack-to-Tower Conversion Kit	-

1. EXP300 Storage Expansion Unit ships with 14 slim-line hot-swap bays which can be configured as a single bus, two independent buses or a twintailed single bus.
2. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.
3. Twintailing reduces the maximum number of HDDs on a single bus to 13.
4. EXP300 includes a single 2M Ultra2 SCSI cable and dual hot-swap 500W redundant power supplies, each with its own power cord.



1. Housed in a 19in rack mountable drawer and ships standard with redundant 500W hot-swap power supplies, two power cords and a single 2M Ultra2 SCSI cable capable of supporting Ultra160 speeds.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.
3. When combined with a ServeRAID-4x controller, Ultra2 and Ultra160 HDDs may be mixed on the same bus and operate at up to their maximum respective speeds.

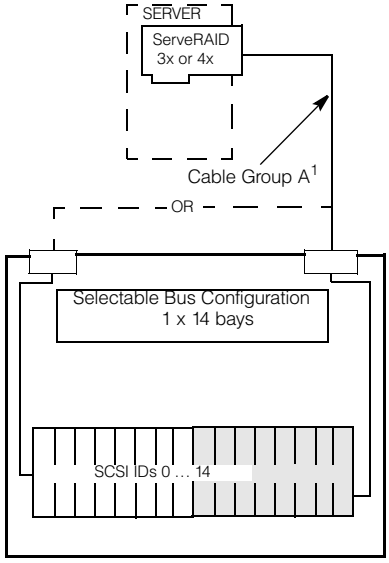
Requires IBM Netfinity Enterprise Rack (930842P) or Expansion Cabinet (930842X), Rack (9306900), NetBAY22 (9306200), NetBAY3 (10L6912), NetBAY3E (36L9701) or Rack-to-Tower Conversion Kit (09N7296).

External Storage Expansion Units require storage controllers and external cables. Select a supported controller from the system configurator and cables from Appendix D: Cables - Storage Units - Controllers.

Cables and Controllers:
See Appendix D: Cables - Storage Units - Controllers

EXP300 Sample Configurations

EXP300 One Independent SCSI Bus

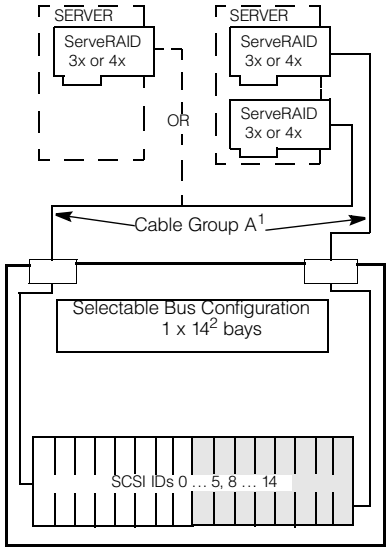


Order:
- 1 x 35311RU
- 1 x External Cable from Group A[1]
- Up to 14 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.

EXP300 One Independent Twintail SCSI Bus High Availability Configuration

To configure as one independent twintailed 13-bay SCSI bus, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 1 x 14[2] bays.

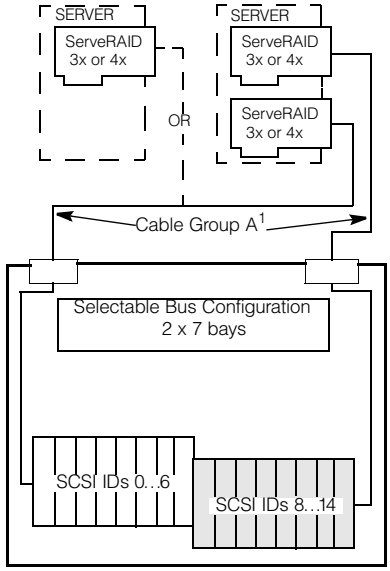


Order:
- 1 x 35311RU
- 2 x External Cables from Group A[1]
- Up to 13 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.
2. Twintailing reduces the maximum number of HDDs on a single bus to 13.

EXP300 Two Independent SCSI Buses

To configure as two independent seven-bay SCSI buses, attach two external cables from two ServeRAID adapters, in the same or separate servers, to the two external ports of the EXP300. The EXP300 must be set for 2 x 7 bays.



Order:
- 1 x 35311RU
- 2 x External Cables from Group A[1]
- Up to 14 Ultra2 and/or Ultra160 HDDs

1. One 2M Ultra2 cable is included with each EXP300. If a longer cable is desired, select one from cable group A.

IBM FAStT EXP500 (35601RU)

FAStT EXP500 Storage Expansion Unit

Total Internal Storage[1]	10,000RPM HDDs			15,000RPM HDDs
	18.2GB (19K0652)	36.4GB (19K0653)	73.4GB (19K0654)	18.2GB (06P5707)
0GB	Standard on base models			
18.2GB	1	-	-	1
36.4GB	2	1	-	2
54.6GB	3	-	-	3
72.8GB	4	2	-	4
73.4GB	-	-	1	-
91.0GB	5	-	-	5
109.2GB	6	3	-	6
145.6GB	8	4	-	8
146.8GB	-	-	2	-
182.0GB	10	5	-	10
218.4GB	-	6	-	-
220.2GB	-	-	3	-
254.8GB	-	7	-	-
291.2GB	-	8	-	-
293.6GB	-	-	4	-
327.6GB	-	9	-	-
364.0 B	-	10	-	-
367.0GB	-	-	5	-
440.4GB	-	-	6	-
513.8GB	-	-	7	-
587.2GB	-	-	8	-
660.6GB	-	-	9	-
734.0GB (max)	-	-	10	-

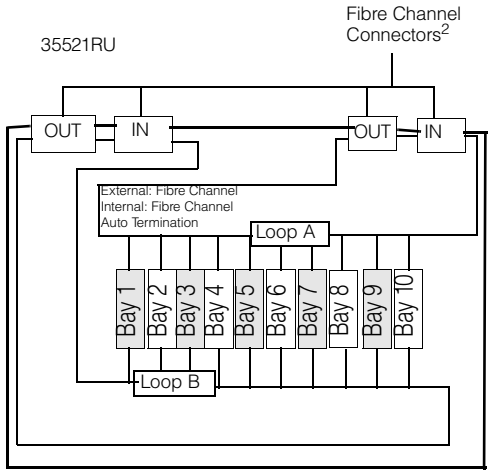
This table does not represent all valid HDD configurations.
1. Select a total storage row and then select the quantity of HDDs from a column corresponding to the HDD of choice. Total Internal Storage listed is within +/- 0.2GB unless otherwise noted.

Part Number	Description	RPM	Height	Bays Supported	Max Qty Supported
19K0652	Netfinity 18.2GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
19K0653	Netfinity 36.4GB 10K-4 FC Hot-Swap HDD	10,000	SL	1 … 10	10
19K0654	Netfinity 73.4GB 10K-4 FC Hot-Swap HDD	10,000	HH	1 … 10	10
06P5707	Netfinity 18.2GB 15K-rpm FC Hot-Swap HDD	15,000	SL	1 … 10	10

External Storage Expansion Units		Form Factor
35601RU	FAStT EXP500 Storage Expansion Unit[1]	Rack (3U)

1. The FAStT EXP500 ncludes two hot-swap, 350W auto-ranging redundant power supplies, each with its own power cord.

FAStT EXP500[1]



1. Housed in a 19in rack mountable drawer and ships standard with redundant power supplies and two power cables requiring separate power sources.
   Requires an IBM industry standard 19in rack, EIA-310D with a minimum depth of 24in (711.2mm) or NetBAY3/3E.
   Select optional storage controllers and external cables, which are not included with the FAStT storage server or external enclosure, using the Fibre Channel Device Ports Reference.
2. GBICs are not included. Either Fibre Channel long or short-wave GBICs (P/N 03K9307 or 03K9308 respectively) may be used.

Fibre Array Solutions

Fibre Interconnection Guidelines

Part Number	Description	00N6881 FAStT Host Adapter	00N6882 FAStT Mini Hub [1]	19K1121 FastT200 Redun Raid Controller [1]	2108R3L SAN Data Gateway Router	2109S08 SAN FC Switch, 8-Port [1]	2109S16 SAN FC Switch, 16-Port [1]	35341RU SAN FC Managed Hub [1]	35421RU FAStT200 Storage Server [1]	35422RU FAStT200 HA Storage Server [1]	35521RU FAStT500 Storage Server [1]	35601RU FAStT EXP500 [1]
00N6881	FAStT Host Adapter	-	-	S	S	S	S	S	S	S	S	-
00N6882	FAStT500 Mini Hub	-	E	E	-	E	E	-	-	-	H	E
19K1121	FAStT200 Redundant RAID Controller	S	-	-	-	E	E	E	H	-	-	-
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port	S	-	-	-	S	S	S	-	-	-	-
2109S08	SAN FC Switch, 8-Port	S	E	E	S	E	E	-	E	E	E	E
2109S16	SAN FC Switch, 16-Port	S	E	E	S	E	E	-	E	E	E	E
35341RU	SAN FC Managed Hub	S	E	E	S	-	-	E	E	E	E	-
35421RU	FAStT200 Storage Server	S	-	H	-	E	E	E	-	-	-	E
35422RU	FAStT200 HA Storage Server	S	-	-	-	E	E	E	-	-	-	E
35521RU	FAStT500 Storage Server	-	H	-	-	E	E	E	-	-	-	E
35601RU	FAStT EXP500	-	E	E	-	-	-	-	E	E	E	E
03K9307	FC Long-Wave GBIC	-	H	H	-	H	H	H	H	H	H	H
03K9308	FC Short-Wave GBIC	-	H	H	-	H	H	H	H	H	H	H

S Short-wave connection only. See Fibre Device Ports Reference section for GBIC/Integrated port information.
E Either short-wave or long-wave connections allowed via the appropriate GBIC. See Fibre Device Ports Reference section for GBIC/Integrated port information.
H Hardware connection: One of these devices installs directly into the other, i.e., the FAStT500 Mini Hub (P/N 00N6882) installs directly into the FAStT500 Storage Server (P/N 35521RU) to provide GBIC availability.

1. This device requires the use of GBICs. Purchase of GBICs may be needed in order to make connections to this device. See the Fibre Device Ports Reference section for GBIC/Integrated port information.

For the latest product & technical information, refer to the Information Sources on pages 2 and 3.

Fibre Device Ports Reference

Part Number	Description	Total Connections Possible	Integrated Ports[3]	Mini Hubs Possible	Mini Hubs Installed	GBIC Ports	GBICs Included[3]
00N6881	FAStT Host Adapter	1	1	-	-	-	-
00N6882	FAStT500 Mini Hub[1]	2	-	-	-	2	-
03K9307	FC Long-Wave GBIC	1	-	-	-	-	-
03K9308	FC Short-Wave GBIC	1	-	-	-	-	-
19K1121	FAStT200 Redundant RAID Controller	2	-	-	-	2	-
2108R3L	San Data Gateway Router UltraSCSI LVD Port[2]	1	1	-	-	-	-
2109S08	SAN FC Switch, 8-Port	8	-	-	-	8	4
2109S16	SAN FC Switch, 16-Port	16	-	-	-	16	4
35341RU	SAN FC Managed Hub	8	7	-	-	1	-
35421RU	FAStT200 Storage Server	2	-	-	-	2	-
35422RU	FAStT200 HA Storage Server	4	-	-	-	4	-
35521RU	FAStT500 Storage Server	16[4]	-	8	4	16[1]	-
35601RU	FAStT EXP500	4	-	-	-	4	-

1. Each FAStT500 Mini Hub provides two GBIC ports.
2. One integrated short-wave optical port and two SCSI ports for tape storage connections (one LVD or HVD Differential and one Single-ended).
3. Standard GBICs and integrated optical ports support are short-wave.
4. FAStT500 Storage Server supports up to eight nonredundant or four redundant host connections and up to eight nonredundant or four redundant storage connections.

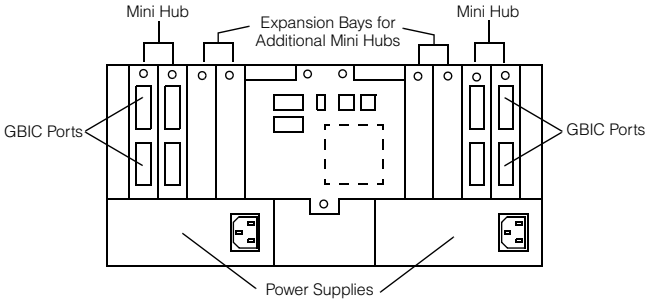
Supported Cable Groups	
Cable Group A (0.8mm to 0.8mm)	
03K9310	Netfinity 2M Ultra2 SCSI Cable
03K9311	Netfinity 4.2M Ultra2 SCSI Cable
37L7101	Netfinity 20M Ultra2 SCSI Cable
Cable Group D (Short-Wave Fibre)	
36L9973	Netfinity Fibre Channel 1M Cable
03K9306	Netfinity Fibre Channel 5M Cable
03K9305	Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)	
Cable Group E (Long-Wave Fibre)	
Customer supplied long-wave cable of up to 10KM (6.2 miles)	
GBIC	
03K9308	Netfinity Fibre Channel Short-Wave GBIC[1]
03K9307	Netfinity Fibre Channel Long-Wave GBIC

1. Four Netfinity Fibre Channel Short-Wave GBIC's (P/N 03K9308) are included with SAN Fibre Channel Switches (P/Ns 2109S08 and 2109S16).

Netfinity FAStT Host Adapter 00N6881

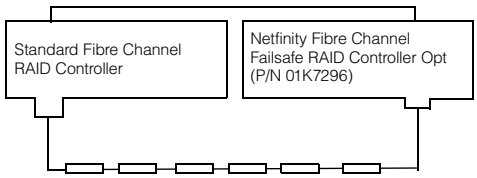
- PCI to FCAL 64/32-bit host adapter.
- Supported Attachments (use cable group D):
  FAStT500 Storage Server
- Integrated short-wave optical port. No GBICs required.
- Full Fibre Channel Fabric support.

FAStT500 Storage Server 35521RU



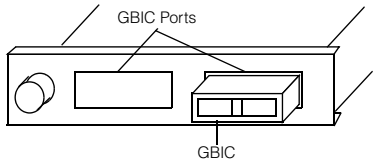
- Dual high-performance, RAID controller cards-supports up to 100MB/sec data transfer rate per controller.
- Two 175W auto-ranging, hot-swap, redundant power supplies.
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) with short-wave cables and GBICs or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D or E with corresponding GBICs.
- Height is 4U (1U = 1.75in or 44.45mm)
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19-inch EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two FAStT500 Storage Servers (P/N 35521RU) should be attached to a single hub (P/N 35341RU)
- Includes four FAStT500 Mini Hubs (P/N 00N6882), two for host and two for storage.
- FAStT500 256MB Cache (P/N 00N6883) expansion is required in installations where a large number of devices are supported.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs not included.

Netfinity Fibre Channel RAID Controller (35261RU)



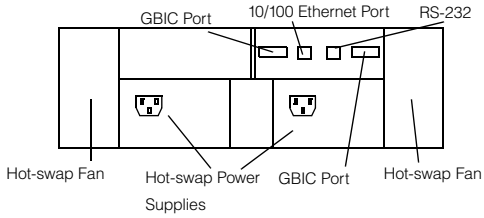
- Contains a single integrated short-wave optical port (use cable group D) and six female 0.8mm Very High Density Connection Interface (VHDCI) SCSI connectors.
- Hot-Swap Redundant Fans and Power Supplies.
- Optional Netfinity Fibre Channel Failsafe RAID Controller (P/N 01K7296) provides a redundant RAID controller and second Short-Wave Fibre Connection (use cable group D).
- Attach directly to FAStT Host Adapter(s) (P/N 00N6881) or indirectly through SAN Fibre Channel Managed Hub (P/N 35341RU) using cables from cable group D.
- Height is 4U (1U =1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- For optimum performance no more than two RAID controller units (P/N 35261RU) should be attached to a single hub.

Netfinity FAStT500 Mini Hub 00N6882



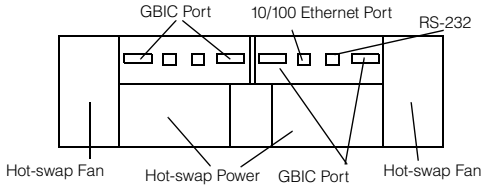
- Provides additional connections to the Netfinity FAStT500 Storage Server - supports complex clustering or advanced storage applications.
- All connections to FAStT500 Mini Hubs require the use of GBICs. GBICs are not included.

FAStT200 Storage Server 35421RU



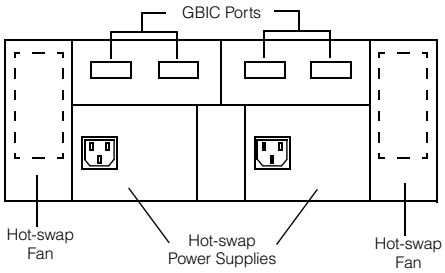
- Contains a single hot-plug, RAID controller which provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Can be upgraded to a FAStT200 HA Storage Server through the addition of a FAStT200 Redundant RAID Controller (P/N 19K1121).
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs - supports optional FAStT EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAStT200 HA Storage Server 35422RU



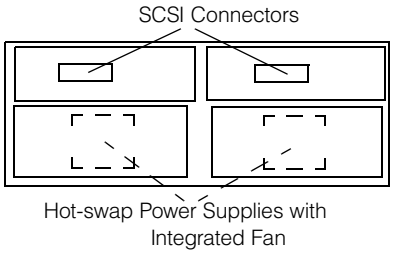
- Contains two hot-plug, RAID controllers. Each controller provides a single host Fibre Channel arbitrated loop and a single storage Fibre Channel arbitrated loop.
- Integrated 10/100Mbps Ethernet connector and RS-232 service support port.
- Performance optimized for 30 HDDs-- supports optional FAStT EXP500 Storage Expansion Units (P/N 35601RU).
- Two hot-swap 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U=1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D industry standard rack. Mounting rails are included with the controller.
- Supports long- and short-wave connections. Requires optional GBICs for each connection. GBICs not included.

FAStT EXP500 Storage Expansion Unit 35601RU



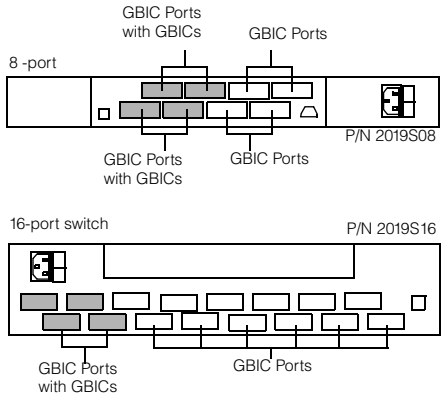
- Two hot-swap, 350W auto-ranging, redundant power supplies.
- Redundant fans - two hot-swap, dual-fan units.
- LED indicators on all critical components warn of faults, over-temperature, and other abnormalities.
- Ten drive bays - supports slim-high or half-high Fibre Channel hot-swap HDDs.
- Height is 3U (1U = 1.75in or 44.45mm).
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.
- Requires optional GBICs for each connection. GBICs not included.

EXP300 Storage Expansion Unit 35311RU



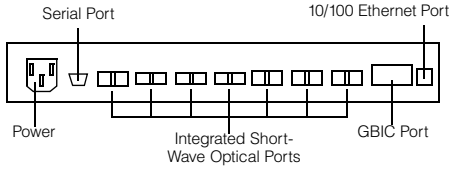
- Fourteen slim-high drive bays.
- Supports Ultra160 SCSI data transfer speeds - up to 160MB/s.
- Single or dual SCSI bus configurations.
- Dual hot-swap 500W redundant power supplies with integrated fan assemblies.
- Height is 3U (1U=1.75in or 44.45mm).
- Tower capability through optional Rack-to-Tower Conversion Kit.
- Requires Netfinity Enterprise Rack or Expansion Cabinet, Netfinity Rack, Netfinity NetBAY22 or 19in EIA-D Industry-Standard Rack. Mounting rails are included with the controller.

SAN Fibre Channel Switch, 8 and 16 Ports 2109S08/S16



- Each port delivers up to 100MB/sec, full-duplex data transfer.
- Comes with four short-wave GBICs installed.
- Embedded Web browser configuration, management and service.
- Support for Public Fibre Channel Arbitrated Loops.
- Optional power supply (P/N 09L5403) available.
- The 8-port switch is 1U (1U=1.75in or 44.45mm) high and the 16-port switch is 2U (1U=1.75in or 44.45mm) high.

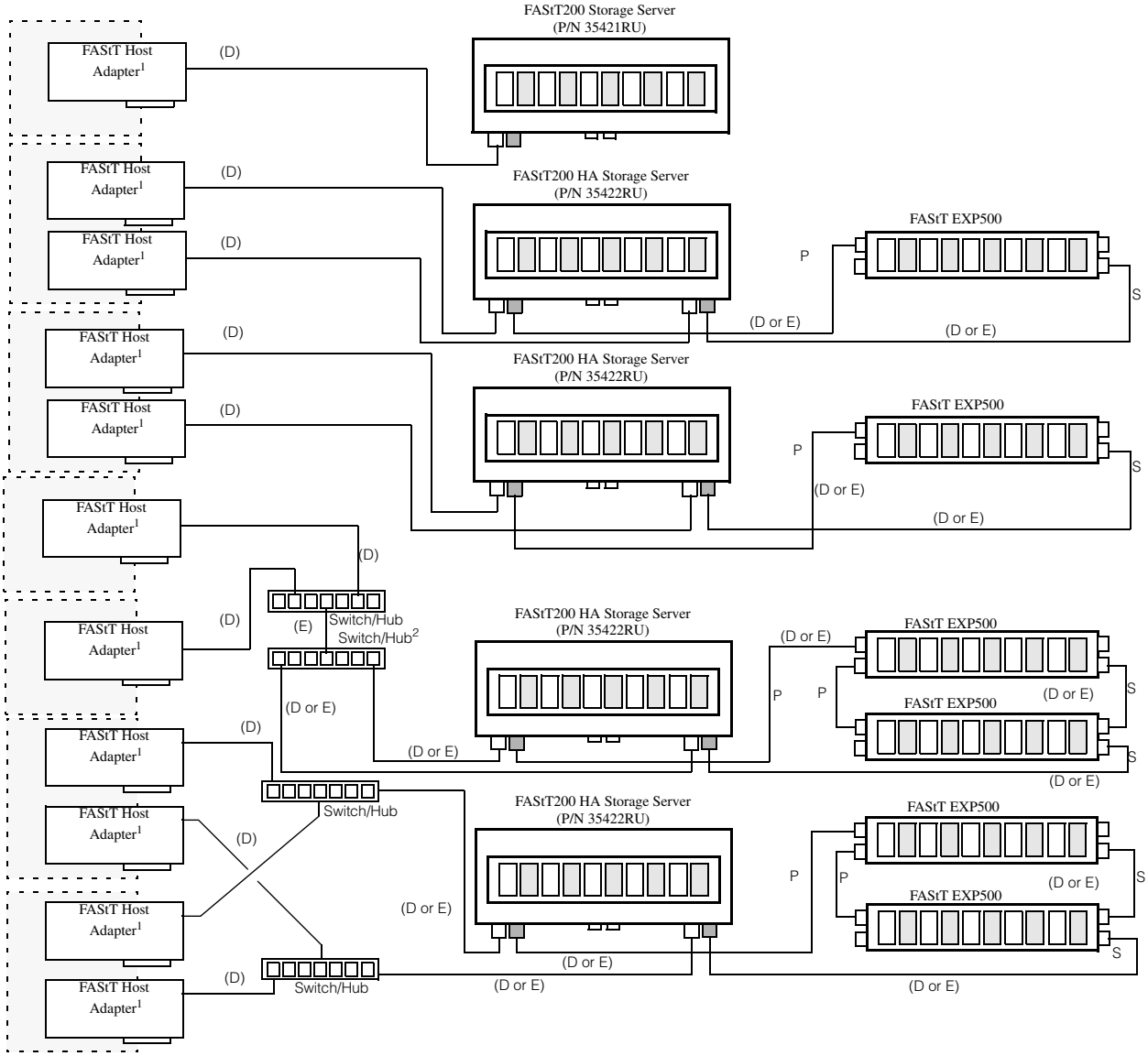
SAN Fibre Channel Managed Hub 35341RU



- High-speed performance utilizing nonblocking switch-based technology.
- Simultaneous 100MB/sec full duplex data transfers across all ports.
- Eight ports total, one that is configurable with either an optional short-wave or long-wave GBIC and seven integrated short-wave optical ports.
- Support for industry standard MIBs enabling standard SNMP management.
- Height is 1U (1U=1.75in or 44.45mm) high.

Fibre / Fibre Configuration Examples (FAStT200)

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



1. FAStT Host Adapter (P/N 00N6881) supports short-wave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal. A managed hub supports only one long-wave GBIC.

- P = primary path, S = secondary (redundant) path
- Shaded boxes represent separate hosts.
- Cable groups are represented by letters in parenthesis.
- Maximum of 30 external storage HDDs are supported for optimum performance (up to 10 in the storage server with the remainder in expansion units).
- The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
- An optional short- or long-wave GBIC is required for all FAStT200 storage server and FAStT EXP500 storage connections. GBICs are not depicted in these diagrams.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

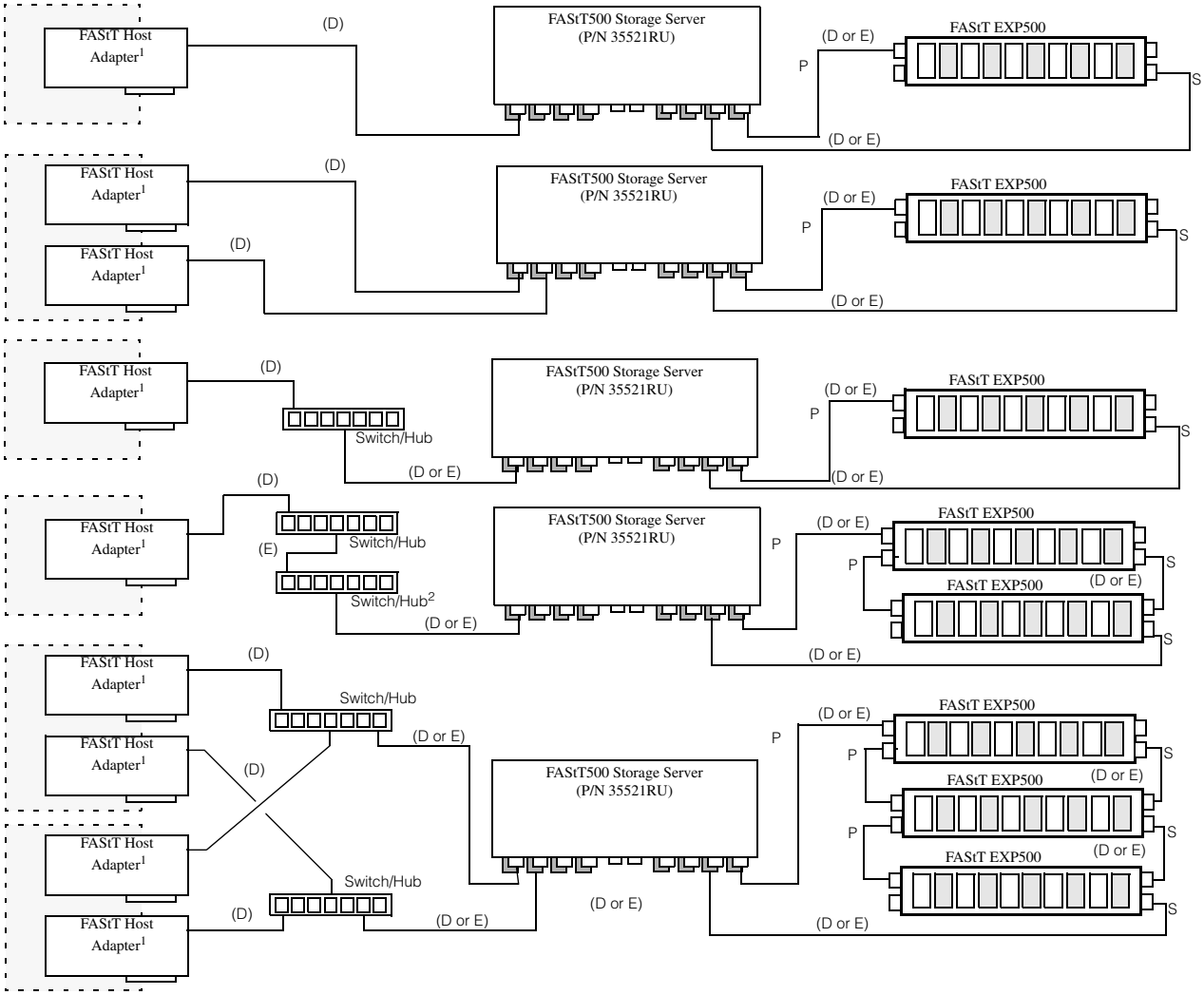
Cable Group D (short-wave Fibre Channel)
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)

Cable Group E (long-wave Fibre Channel)
Customer supplied long-wave cable of up to 10KM 6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

Fibre / Fibre Configuration Examples (FAStT500)

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements.



1. FAStT Host Adapter (P/N 00N6881) supports shortwave connections only.
2. Buffering the long-wave optic cable expanse with a second switch or hub at the remote storage location is required to requalify the signal.

- P = Primary path, S = Secondary/Redundant path
- Shaded boxes represent separate hosts.
- Cable groups are represented by letters in parenthesis.
- Maximum of 220 external storage HDDs are supported through 11 enclosures in each cable pair.
- The number of servers that can be used in configurations with managed hubs or Fibre Channel switches are dependent on partitioning restrictions of the management system or cluster software.
- An optional short- or long-wave GBIC is required for all FAStT500 storage server and FAStT EXP500 storage connections. GBICs are not depicted in these diagrams.
- Other Fibre Channel devices may not require optional GBICs. For specific requirements, see the Fibre Device Ports Reference.

Cable Group D (Short-Wave Fibre)
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500M (0.31 miles)

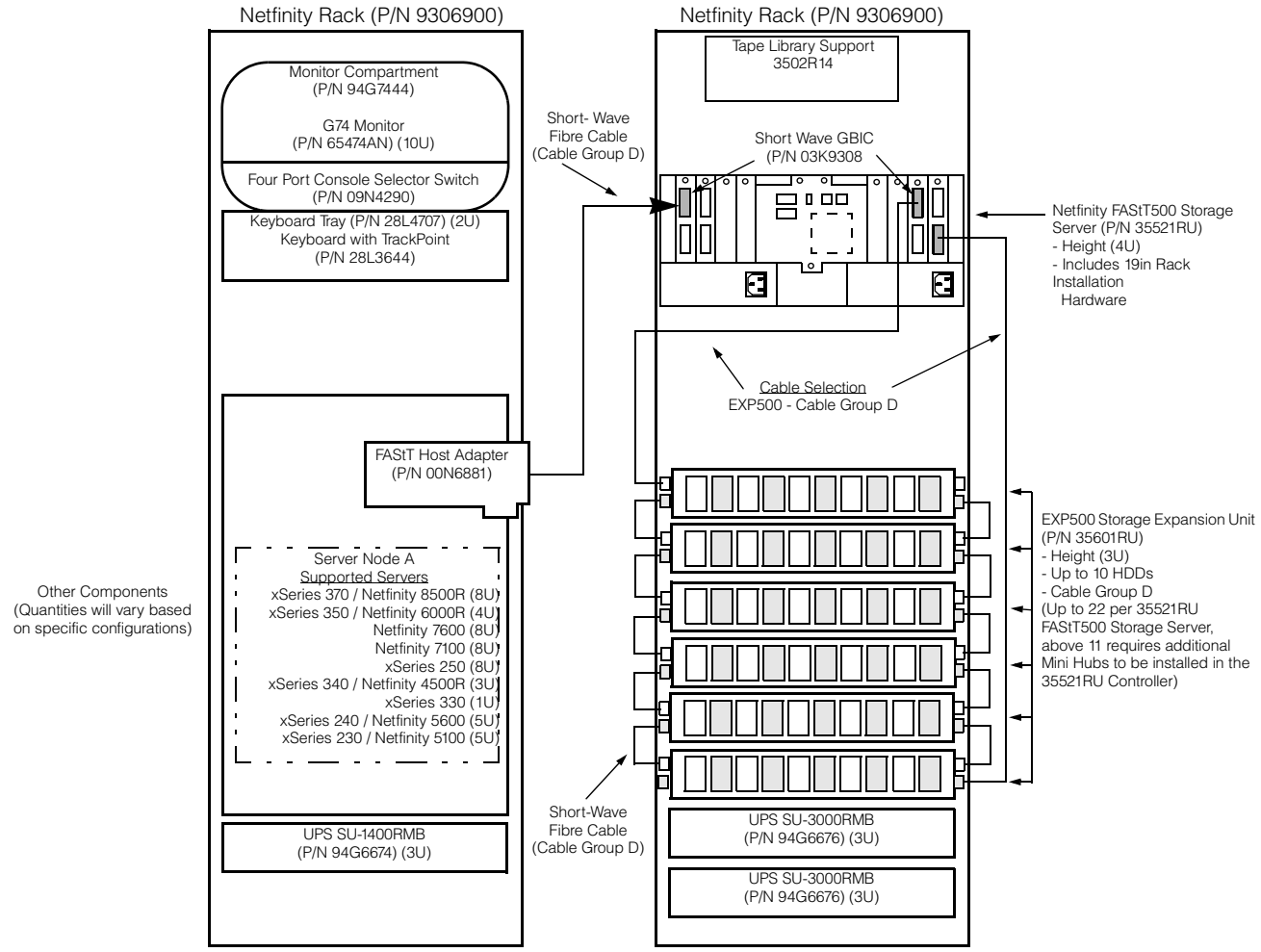
Cable Group E (long-wave Fibre Channel)
Customer supplied long-wave cable of up to 10KM (6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

IBM xSeries and Netfinity Fibre Array Solutions

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements

High-speed, single-node xSeries and Netfinity Fibre Channel storage configuration offering performance, bandwidth & capacity

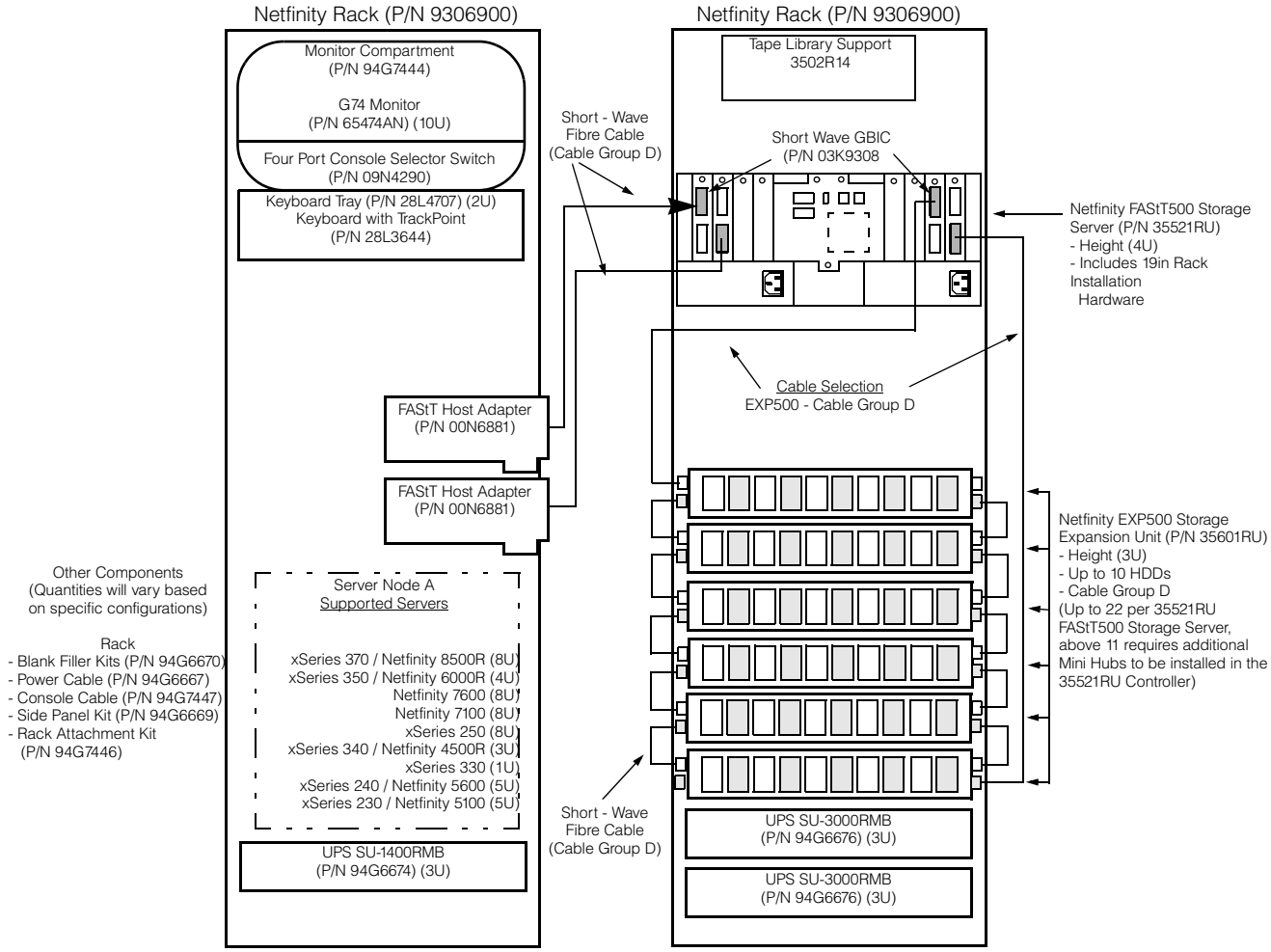

Netfinity Rack (P/N 9306900)
Netfinity Rack (P/N 9306900)
Monitor Compartment (P/N 94G7444)
G74 Monitor (P/N 65474AN) (10U)
Four Port Console Selector Switch (P/N 09N4290)
Keyboard Tray (P/N 28L4707) (2U)
Keyboard with TrackPoint (P/N 28L3644)
Tape Library Support 3502R14
Short- Wave Fibre Cable (Cable Group D)
Short Wave GBIC (P/N 03K9308
Netfinity FAStT500 Storage Server (P/N 35521RU)
- Height (4U)
- Includes 19in Rack Installation Hardware
Cable Selection
EXP500 - Cable Group D
FAStT Host Adapter (P/N 00N6881)
Server Node A
Supported Servers
xSeries 370 / Netfinity 8500R (8U)
xSeries 350 / Netfinity 6000R (4U)
Netfinity 7600 (8U)
Netfinity 7100 (8U)
xSeries 250 (8U)
xSeries 340 / Netfinity 4500R (3U)
xSeries 330 (1U)
xSeries 240 / Netfinity 5600 (5U)
xSeries 230 / Netfinity 5100 (5U)
Other Components (Quantities will vary based on specific configurations)
EXP500 Storage Expansion Unit (P/N 35601RU)
- Height (3U)
- Up to 10 HDDs
- Cable Group D
(Up to 22 per 35521RU FAStT500 Storage Server, above 11 requires additional Mini Hubs to be installed in the 35521RU Controller)
Short-Wave Fibre Cable (Cable Group D)
UPS SU-1400RMB (P/N 94G6674) (3U)
UPS SU-3000RMB (P/N 94G6676) (3U)
UPS SU-3000RMB (P/N 94G6676) (3U)

Connector Types 68-pin - High Density Connector 0.8mm - Very High Density Connection Interface (VHDCI)	Cable Group D (Short-Wave Fibre) 36L9973 - Netfinity Fibre Channel 1M Cable 03K9306 - Netfinity Fibre Channel 5M Cable 03K9305 - Netfinity Fibre Channel 25M Cable Customer supplied short-wave cable of up to 500m (0.31 miles)
Cable Group A (0.8mm to 0.8mm) 03K9310 - Netfinity 2M Ultra2 SCSI Cable 03K9311 - Netfinity 4.2M Ultra2 SCSI Cable 37L7101 - Netfinity 20M Ultra2 SCSI Cable	Cable Group E (Long-Wave Fibre) Customer supplied long-wave cable of up to 10km (6.2 miles) GBIC 03K9308 - Netfinity Fibre Channel Short-Wave GBIC 03K9307 - Netfinity Fibre Channel Long-Wave GBIC

IBM xSeries and Netfinity Fibre Array Solutions

Note: The following sample configurations are for illustration only and may not be suitable for any specific customer installation. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements

High-speed, single-node xSeries and Netfinity Fibre Channel storage configuration with Microsoft NT failover support and RAID redundancy for availability, performance and capacity



Connector Types
68-pin - High Density Connector
0.8mm - Very High Density Connection Interface (VHDCI)

Cable Group A (0.8mm to 0.8mm)
03K9310 - Netfinity 2M Ultra2 SCSI Cable
03K9311 - Netfinity 4.2M Ultra2 SCSI Cable
37L7101 - Netfinity 20M Ultra2 SCSI Cable

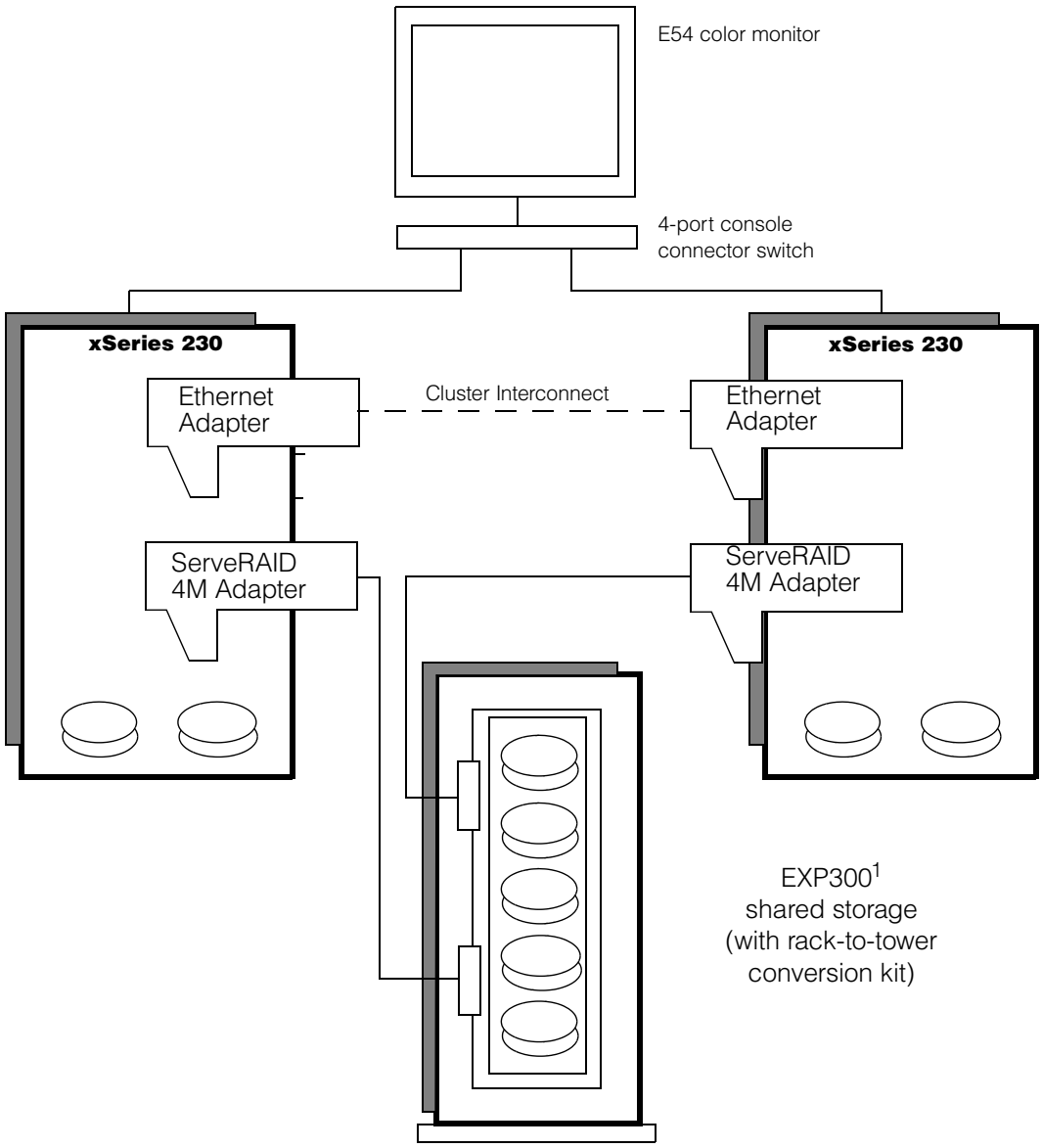
Cable Group D (Short-Wave Fibre)
36L9973 - Netfinity Fibre Channel 1M Cable
03K9306 - Netfinity Fibre Channel 5M Cable
03K9305 - Netfinity Fibre Channel 25M Cable
Customer supplied short-wave cable of up to 500m (0.31 miles)

Cable Group E (Long-Wave Fibre)
Customer supplied long-wave cable of up to 10km (6.2 miles)

GBIC
03K9308 - Netfinity Fibre Channel Short-Wave GBIC
03K9307 - Netfinity Fibre Channel Long-Wave GBIC

High Availability and Scalable Cluster Solutions

xSeries 230 High Availability Cluster



1. Configured as a single independent twintail SCSI bus for high availability.

New xSeries 230 cluster solution starts up quick and smart with secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration--it's ready-to-run right out of the box.

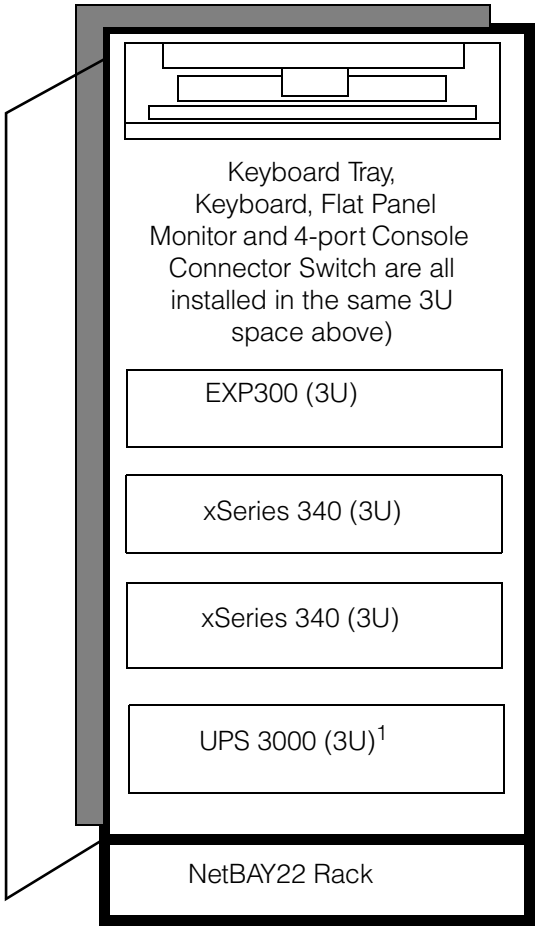
These tower solutions leverage the latest xSeries 230 server platform with choices of Windows® network operating system software and preloaded cluster middleware. Features include the following:
- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or NT 4.0 EE operating systems preloaded
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage

North America order numbers: x230 HA Cluster - NT (P/N 25P1821), x230 HA Cluster - Windows 2000 (P/N 25P1822)

xSeries 230 High Availability Cluster (P/N 25P1821 and 25P1822)[1]

Part Number	Server Nodes	Qty	Usage
865861Y	xSeries 230, 1GHz, 128MB RAM	2	cluster nodes, onboard ethernet for public network access
37L7204	IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	4	2 per node attached to integrated Ultra160 SCSI Controller
37L6080	IBM ServeRAID-4M Ultra160 SCSI Controller	2	1 per node for shared storage controller
06P3601	10/100 Ethernet Server Adapter	2	Clustering Heartbeat
	Storage Subsystem		
35311RU	IBM EXP300 External Storage Enclosure	1	1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs
09N7296	Netfinity EXP300 Rack-to-Tower Conversion Kit	1	convert standard rack-mount device to tower
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap HDD	5	RAID 5 shared storage in EXP300
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
	Cluster Interconnect		
19K5788	Ethernet Cluster Interconnect Cable	1	Ethernet Crossover for interconnection between clustered nodes
	Monitor / Console		
6331N2N	E54 Color Monitor - 15in (13.7in viewable image size)	1	
09N4290	Netfinity Console Server Selector Switch (4-port)	1	
09N4293	7ft Console Cable Set	2	1 console set per node
2446177	Solution Integration Charge	2	
06P4610	Cluster Bundle Publications Pack for xSeries 230	1	
	Preloaded Software (specify option)		Select Windows NT 4.0EE or Windows 2000 Advanced Server
01N0985	Microsoft Windows NT Server 4.0EE with MSCS	1	NOS and Cluster Middleware preloaded
01N0986	Windows 2000 Advanced Server	1	NOS and Cluster Middleware preloaded
	Recommended Options		
19K4640	xSeries 1GHz/256KB Upgrade with Pentium III Processor	2	SMP for nodes
33L3123	IBM 128MB 133MHz SDRAM ECC RDIMM II	2	Memory upgrade
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	9	RAID 5 shared storage in EXP300
01K7209	Netfinity Advanced Systems Management PCI Adapter	1	1 per cluster
03K9309	Netfinity Advanced Systems Management Interconnect	1	1 included with PCI adapter, 1 option required for second system
33L4618	PCI V90 56 Data/Fax Modem	2	communications (1 per node)
00N7990	40/80GB Internal DLT Tape Drive	1	tape back-up
94G3136	APC Smart-UPS 1400	1	

1. P/N 25P1821 includes Windows NT EE as the operating system for this integrated tower solution. P/N 25P1822 uses Windows 2000 Advanced Server.



(Refer to xSeries 230 HA Cluster diagram for basic external cabling and HDD configuration.)

1. Either a UPS 3000 or PDU can be installed. Power options are not shipped standard with the cluster bundle.

New xSeries 340 cluster solution starts up quick and smart with secure operation of business-critical applications. IBM gives you an easy transition with this complete, test-proven, high availability (HA) hardware and software configuration--it's ready-to-run right out of the box.

These rack solutions leverage the latest xSeries 340 server platform with choices of Windows network operating system software and preloaded cluster middleware. Features include the following:
- Prepackaged for single part number ordering and customer cost savings
- Scaled for business growth
- Ready-to-run with cluster middleware and either Windows 2000 Advanced Server or NT 4.0 EE operating systems preloaded
- Test-proven high availability hardware and software for business-critical applications
- Flexibility to handle unique computing environments
- Fully redundant with failover protection and RAID-protected internal and external storage

North America order numbers: x340 HA Cluster - NT (P/N 25P1823), x340 HA Cluster - Windows 2000 (P/N 25P1824)

xSeries 340 High Availability Cluster (P/N 25P1823 and 25P1824)[1]

Part Number	Server Nodes	Qty	Usage
86566RY	xSeries 340, 1GHz, 128MB RAM	2	cluster nodes, onboard ethernet for public network access
37L7204	IBM 9.1GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	4	2 per node attached to integrated Ultra160 SCSI Controller
37L6080	IBM ServeRAID-4M Ultra160 SCSI Controller	2	1 per node for shared storage controller
06P3601	10/100 Ethernet Server Adapter	2	Clustering Heartbeat
	Storage Subsystem		
35311RU	IBM EXP300 External Storage Enclosure	1	1 EXP300 per ServeRAID pair, max of 14 Ultra160 HDDs
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	5	RAID 5 shared storage in EXP300
03K9310	Netfinity 2M Ultra2 SCSI Cable	1	server to EXP300 (EXP300 ships with one 2M cable)
	Rack, Monitor, Console		
9306200	NetBAY22 Rack	1	22U rack cabinet
9511AG1	T54A Flat Panel Monitor	1	
37L6888	Flat Panel Monitor Rack Kit	1	
28L4707	Netfinity Rack Keyboard Tray	1	
28L3644	Space Saver Keyboard	1	
09N4290	Netfinity Console Server Selector Switch (4-port)	1	
09N4293	7ft Console Cable Set	2	1 console set per node
94G6670	Blank Filler Panel Kit	1	
2446177	Solution Integration Charge	2	
06P4610	Cluster Bundle Publications Pack for xSeries 230	1	
	Cluster Interconnect		
19K5788	Ethernet Cluster Interconnect Cable	1	Ethernet Crossover for interconnection between clustered nodes
	Preloaded Software (specify option)		Select Windows NT 4.0EE or Windows 2000 Advanced Server
01N0985	Microsoft Windows NT Server 4.0EE with MSCS	1	NOS and Cluster Middleware preloaded
01N0986	Windows 2000 Advanced Server	1	NOS and Cluster Middleware preloaded
	Recommended Options		
19K4640	xSeries 1GHz/256KB Upgrade with Pentium III Processor	2	SMP for nodes
33L3123	IBM 128MB 133MHz SDRAM ECC RDIMM II	2	Memory upgrade
37L7205	IBM 18.2GB 10K-4 Ultra160 SCSI Hot-swap SL HDD	9	RAID 5 shared storage in EXP300
01K7209	Netfinity Advanced Systems Management PCI Adapter	1	1 per cluster
03K9309	Netfinity Advanced Systems Management Interconnect	1	1 included with PCI adapter, 1 option required for second system
33L4618	PCI V90 56 Data/Fax Modem	2	communications (1 per node)
00N7990	40/80GB Internal DLT Tape Drive	1	tape back-up
94G6676	APC Smart-UPS 3000RMB	1	
37L6866	NetBAY Rack PDU	2	

1. P/N 25P1823 includes Windows NT EE as the operating system for this integrated rack solution. P/N 25P1824 uses Windows 2000 Advanced Server.

IBM Datacenter Solutions

IBM's new Datacenter Solution Program is a comprehensive set of product and service offerings intended to deliver true enterprise computing solutions based on the Microsoft Windows 2000 Datacenter Server operating system. The Windows 2000 Datacenter Server product runs on the new xSeries 370 rack-mounted server, which offers up to 8-way processing, up to 32GB of memory, Fibre Channel and SCSI storage, and 12 PCI slots. The Datacenter Solution can be ordered in one- and two-node configurations from the bundles shown here, and in three- and four-node configurations by ordering additional nodes. The bundles illustrated here are base configurations that can be expanded to meet your needs. The IBM Datacenter Solution includes not only Microsoft-certified hardware, but also the Windows Datacenter Server operating system preloaded and a set of required services. In addition, a wide variety of optional services are available from IBM to meet your specifications.

In addition to the information on the following pages, the IBM Datacenter Solution Program includes the following software and required services. The services products must be ordered separately. A complete Solutions Assurance review will be conducted by IBM to ensure that the configuration being ordered is complete.

Software

Microsoft Windows 2000 Datacenter Server, licensed for up to 8 CPU's
(Client Access Licenses to be purchased separately)
IBM Director 2.2
IBM Director Universal Management Services
Norton AntiVirus Corporate Edition
APC UPS Software

Required IBM Services

Warranty service upgrade (24x7x4 hour response)
Factory installation and on-site setup
Advanced Support for Mission Critical Systems

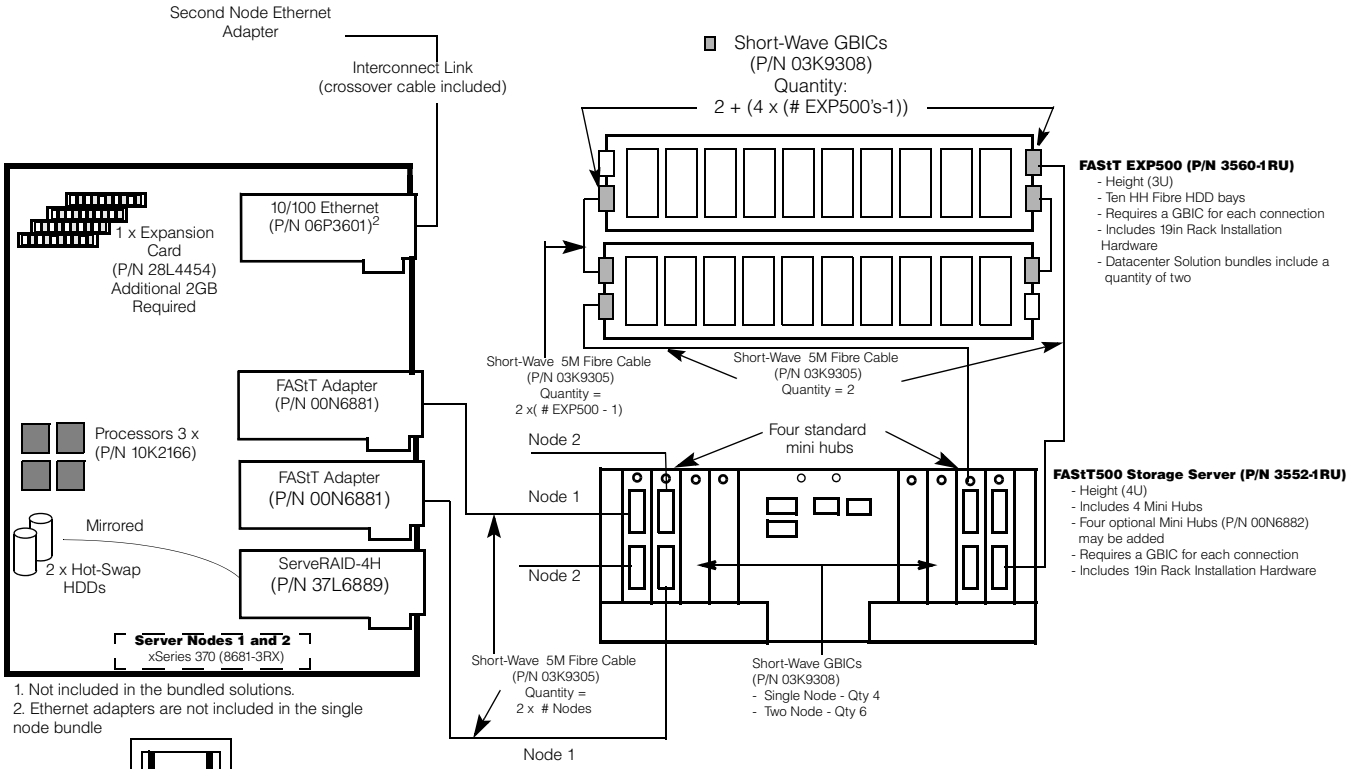
Optional IBM Services

High Availability Services[1] (including up to 99.99% availability guarantee in the US)
xSeries 99.9% High Availability Guarantee outside of the US
Warranty service upgrade (24x7x2 hour response)
Operational Support Services--electronic systems management, account advocate, and more
Testing services--proof of concept, assessment, design, and planning
Business Continuity and Recovery Services
Custom services for unique requirements

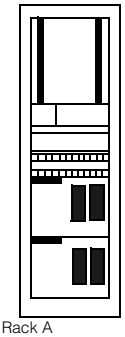
1. The High Availability Services for Business Critical Systems offering for an availability guarantee is an optional service and is only offered for eligible xSeries environments at this time. IBM reserves the right to change the terms and conditions of the program at any time, without notice. For more details, refer to www-1.ibm.com/services/its/us/highavail2.html.

Datacenter Solutions

The product content described here is consistent worldwide; however, there may be some variance in IBM part numbers outside of the US and Canada. Contact your IBM Business Partner or IBM Marketing Representative for assistance with your specific configuration requirements


Second Node Ethernet Adapter
Interconnect Link (crossover cable included)
Short-Wave GBICs (P/N 03K9308) Quantity: 2 + (4 x (# EXP500's-1))
FAStT EXP500 (P/N 3560-1RU)
- Height (3U)
- Ten HH Fibre HDD bays
- Requires a GBIC for each connection
- Includes 19in Rack Installation Hardware
- Datacenter Solution bundles include a quantity of two
10/100 Ethernet (P/N 06P3601)2
1 x Expansion Card (P/N 28L4454) Additional 2GB Required
FAStT Adapter (P/N 00N6881)
Processors 3 x (P/N 10K2166)
FAStT Adapter (P/N 00N6881)
Mirrored
2 x Hot-Swap HDDs
ServeRAID-4H (P/N 37L6889)
Server Nodes 1 and 2
xSeries 370 (8681-3RX)
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2 x(# EXP500 - 1)
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2
Node 2
Four standard mini hubs
Node 1
Node 2
FAStT500 Storage Server (P/N 3552-1RU)
- Height (4U)
- Includes 4 Mini Hubs
- Four optional Mini Hubs (P/N 00N6882) may be added
- Requires a GBIC for each connection
- Includes 19in Rack Installation Hardware
Short-Wave 5M Fibre Cable (P/N 03K9305) Quantity = 2 x # Nodes
Short-Wave GBICs (P/N 03K9308)
- Single Node - Qty 4
- Two Node - Qty 6
Node 1

1. Not included in the bundled solutions.
2. Ethernet adapters are not included in the single node bundle



Rack A
FAStT500
Flat Panel Monitor
Keyboard
Console Switch
EXP500
EXP500
x370
x370
PDU (not included)
PDU (not included)

	IBM Datacenter Solution - Single Node (P/N 21P9961)				
Bundle (P/N 21P9961) Components	IBM Datacenter Solution - Single Node (P/N 21P9961) includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval.			**Warranty Service 24x7x4 hrs**	**Warranty Service 24x7x2 hrs[1]**
Part Number	**Description**	**Qty**	**Usage**	**Part Number**	**Part Number**
	Server Node 1				
8681-3RX	xSeries 370 900MHz/2MB, 512MB ECC, OPEN, 40X, PCI (Rack 8U)	1		41L2742	41L2743
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	3	Total of 4 SMP processors per node	N/A	N/A
28L4454	Netfinity 8500R Memory Expansion Card	1	Enables cache line interleaving and requires installation of matched RDIMM pairs	N/A	N/A
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	Provides NOS mirroring on internal HDDs	N/A	N/A
00N6881	Netfinity FAStT Host Adapter	2	Redundant paths to external storage subsystems	N/A	N/A
	Storage Subsystems				
35521RU	FAStT500 Storage Server	1	Provides for redundant paths from the server to the storage unit	41L2768	41L2769
35601RU	FAStT EXP500 Storage Expansion Unit	2	HDDs should be added in matched pairs	41L2766	41L2767
	Storage Cables		Calculations assume no switches are installed		
03K9306	Netfinity Fibre Channel 5M Cable	6	Redundant Paths: Nodes - Storage Server - EXP500	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC	10	Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1)	N/A	N/A
	Other Non-Rack				
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), Stealth black	1		30L9183	N/A
28L3644	Space Saver II Keyboard	1		N/A	N/A
	Rack and Related Components				
930842P	Netfinity Enterprise Rack	1		41L2762	41L2763
94G6670	Blank Filler Panel Kit	3	Fills empty front panel space to control air flow	N/A	N/A
28L4707	Netfinity Rack Keyboard Tray	1	Supports Flat Panel Monitor with Kit 37L6888 and stowage of Keyboard 28L3644 in a ready-to-use position.	N/A	N/A
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II	1	Required for installing flat panel monitor in keyboard tray 28L4707	N/A	N/A
09N4290	NetBAY 1x4 Console Switch	1	Attaches up to 4 nodes to a single monitor, keyboard and mouse.	N/A	N/A
94G7447	NetBAY Console Cable Set 12ft (3.66m)	1	Attaches each node to a Console Server Selector Switch	N/A	N/A
94G7448	Power Cable Type C12 (3.7m, 12ft)	6	Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord	N/A	N/A
	Publications and Software				
22P4745	OS Preload Kit / Ship Group	1		N/A	N/A
	Services				
06P7505	Image Load Fee	1		N/A	N/A
06P7514	Enterprise Rack Prep Fee	1		N/A	N/A
06P7515	Enterprise Rack Installation Fee	4		N/A	N/A

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).

All final customer configurations and solutions require IBM Solution Assurance Approval.

IBM Datacenter Solution - Two Node (P/N 21P9962)

Bundle (P/N 21P9962) Components	IBM Datacenter Solution - Two Node (P/N 21P9962) includes the part numbers and quantities identified in this table. Required options must be purchased separately and are identified in the table labeled "Required Options." Additional options for IBM Datacenter Solutions are listed in the table labeled "Selectable Options." All final customer configurations and solutions require IBM Solution Assurance Approval.				Warranty Service 24x7x4 hrs	Warranty Service 24x7x2 hrs[1]
Part Number	**Description**	**Qty/ Node**	**Total Qty**	**Usage**	**Part Number**	**Part Number**
	Server Nodes 1 and 2					
8681-3RX	xSeries 370 900MHz/2MB, 512MB ECC, OPEN, 40X, PCI (Rack 8U)	1	2		41L2742	41L2743
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	3	6	Total of 4 SMP processors per node	N/A	N/A
28L4454	Netfinity 8500R Memory Expansion Card	1	2	Enables cache line interleaving and requires installation of matched RDIMM pairs.	N/A	N/A
37L6889	ServeRAID-4H Ultra160 SCSI Controller	1	2	Provides NOS mirroring on internal HDDs.	N/A	N/A
00N6881	Netfinity FAStT Host Adapter	2	4	Redundant paths to external storage subsystems	N/A	N/A
	Storage Subsystems					
35521RU	FAStT500 Storage Server	-	1		41L2768	41L2769
35601RU	FAStT EXP500 Storage Expansion Unit	-	2		41L2766	41L2767
	Storage Cables			Calculations assume no switches are installed		
03K9306	Netfinity Fibre Channel 5M Cable	-	8	Redundant Paths: Nodes - Storage Server - EXP500	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC	-	12	Redundant Paths: (2 x # Nodes + 4) +4 x (# EXP500's - 1)	N/A	N/A
	Interconnect Components					
19K5788	25ft Ethernet Crossover Cable	-	1	Interconnects 2 nodes without an Ethernet switch	N/A	N/A
06P3601	10/100 Ethernet Server Adapter	1	2	Node to node interconnect	N/A	N/A
	Other Non-Rack					
9511AG1	T54A TFT LCD Color Monitor (306mm x 230mm, 15in Viewable Image Size), Stealth black	-	1		30L9183	N/A
28L3644	Space Saver II Keyboard	-	1		N/A	N/A
	Rack and Related Components					
930842P	Netfinity Enterprise Rack	-	1		41L2762	41L2763
94G6670	Blank Filler Panel Kit	-	2	Fills empty front panel space to control air flow	N/A	N/A
28L4707	Netfinity Rack Keyboard Tray	-	1	Supports Flat Panel Monitor with Kit 37L6888 and stowage of Keyboard 28L3644 in a ready-to-use position.	N/A	N/A
37L6888	Netfinity Flat Panel Monitor Rack Mount Kit II	-	1	Required for installing flat panel monitor in keyboard tray 28L4707	N/A	N/A
09N4290	NetBAY 1x4 Console Switch	-	1	Attaches up to 4 nodes to a single monitor, keyboard and mouse.	N/A	N/A
94G7447	NetBAY Console Cable Set 12ft (3.66m)	1	2	Attaches each node to a Console Server Selector Switch	N/A	N/A
94G7448	Power Cable Type C12 (3.7m, 12ft)	-	7	Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord	N/A	N/A
	Publications and Software					
22P4745	OS Preload Kit / Ship Group	1	2		N/A	N/A
	Services					
06P7505	Image Load Fee	1	2		N/A	N/A
06P7514	Enterprise Rack Prep Fee	-	1	Quantity equals the number of racks	N/A	N/A
06P7515	Enterprise Rack Installation Fee	-	5	Quantity equals the number of major rack components installed	N/A	N/A

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).

All final customer configurations and solutions require IBM Solution Assurance Approval.

IBM Datacenter Solution - Required Options

Required Options	Required Options provide alternative methods of meeting minimum memory and storage requirements. Customer requirements will vary; therefore, these options are configured and purchased separate from the base solution bundle. All final customer configurations and solutions require IBM Solution Assurance Approval.			Warranty Service 24x7x4 hrs	Warranty Service 24x7x2 hrs[1]
Part Number	**Description**	**Qty/ Node**	**Usage**	**Part Number**	**Part Number**
Select one of the three memory options per node.		RDIMMs must be added in matched pairs within each node. A minimum of 2GB must be added to each bundled node.			
33L3056	Netfinity 1GB SDRAM ECC RDIM II	2 + 2N	Minimum of 2	N/A	N/A
20L0249	Netfinity 512MB SDRAM ECC RDIMM II	4 + 2N	Minimum of 4	N/A	N/A
33L3149	512MB 100MHz ECC SDRAM RDIMM	4 + 2N	Minimum of 4	N/A	N/A
Select one of the two internal HDD options per node			Two HDDs must be installed in each node		
37L7203	36.4GB Ultra160 SCSI Hot-Swap SL HDD	2	Internal HDDs for NOS installation	N/A	N/A
37L7206	36.4GB 10K-4 Ultra160 SCSI Hot-Swap SL HDD	2	Internal HDDs for NOS installation	N/A	N/A
Select F/C HDD options (multiple of 2) per bundle		A minimum of 2 HDDs must be installed, one in each FAStT500 Storage Expansion Unit. Additional HDDs must be installed in multiples of 2.			
06P5707	Netfinity 18.2GB 15Krpm FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0652	18.2GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0653	36.4GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
19K0654	73.4GB 10K-4 FC Hot-Swap HDD		Install in EXP500s	N/A	N/A
Select one of the two Warrany Services per bundle					
24X7X4 option	Use the above applicable P/Ns with the right quantity				
24X7X2 option	Use the above applicable P/Ns with the right quantity				

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).

All final customer configurations and solutions require IBM Solution Assurance Approval.

IBM Datacenter Solution - Selectable Options

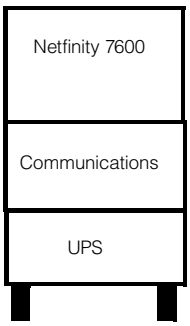
Selectable Options	Selectable options are not required but are compatible for use with IBM Datacenter bundles. A comprehensive list of supported options can be found at www.developer.ibm.com/welcome/ netfinity, under 'NEWS' select 'Solutions Library,' perform a search for 'Microsoft,' click on 'Windows 2000 Datacenter Server.' All final customer configurations and solutions require IBM Solution Assurance Approval.		Warranty Service 24x7x4 hrs	Warranty Service 24x7x2 hrs[1]	Enterprise Rack Assembly Fee
Part Number	**Description**	**Usage**	**Part Number**	**Part Number**	**Part Number**
21P9960[2]	Datacenter Server Bundle-Additional node	Preloaded xSeries 370 for nodes 3 and 4.	41L2742	41L2743	21P3342
19K4637	xSeries 370 900MHz/2MB Upgrade with Pentium III Xeon Processor	xSeries 370 supports up to 8 SMP processors. Installation of 5 or more requires Filter and Expansion Kits (P/N 10K2335 and 10K2337)	N/A	N/A	N/A
10K2337	Netfinity Mezzanine Expansion Kit	Required for installation of processors 5 through 8. Requires Filter (P/N 10K2335)			
10K2335	Netfinity 4X Accelerator Filter	Required when installing Mezzanine Expansion Kit (P/N 10K2337)			
00N6881	Netfinity FAStT Host Adapter		N/A	N/A	N/A
35521RU	FAStT500 Storage Server		41L2768	41L2769	21P3342
35601RU	FAStT500 Storage Expansion Unit		41L2766	41L2767	21P3342
36L9973	Netfinity Fibre Channel 1M Cable		N/A	N/A	N/A
03K9306	Netfinity Fibre Channel 5M Cable		N/A	N/A	N/A
03K9308	Netfinity Fibre Channel Short-Wave GBIC		N/A	N/A	N/A
2109S08	SAN Fibre Channel Switch, 8-port		Standard	N/A	21P3342
09L5403	SAN Switch Redundant Power Supply		N/A	N/A	N/A
2108R3L	SAN Data Gateway Router UltraSCSI LVD Port		N/A	N/A	21P3342
37L6889	ServeRAID-4H Ultra160 SCSI Controller		N/A	N/A	N/A
06P3601	10/100 Ethernet Server Adapter		N/A	N/A	N/A
34L0701	Token-Ring 16/4 PCI Adapter 2 with Wake on LAN		N/A	N/A	N/A
06P3701	Gigabit Ethernet SX Server Adapter (fiber)				
31L3820	Fast Ethernet on STP Adapter 2.5m Cable	Attachment from ethernet adapter to ethernet switch	N/A	N/A	N/A

34L0301	Netfinity Gigabit Ethernet SX Adapter		N/A	N/A	N/A
31L3820	Fast Ethernet on STP Adapter 2.5m Cable	Attachment from ethernet adapter to ethernet switch	N/A	N/A	N/A
930842P	Netfinity Enterprise Rack		41L2762	41L2763	21P3341
930842X	Netfinity Enterprise Expansion Cabinet		41L2762	41L2763	21P3341
94G7448	Power Cable Type C12 (3.7m, 12ft)	Provides IEC 320-C13 (Device) to IEC 320-C14 (Power Unit) power cord	N/A	N/A	N/A
94G7450	200-240V Power Distribution Unit		N/A	N/A	N/A
37L6861	APC Smart-UPS 5000RMB		N/A	N/A	21P3342
3502R14	DLT Tape Library - Rack (includes SCSI Adapter)		41L2747	N/A	21P3342
06P3882[3]	Cisco CAT2912 12-port Ethernet Switch/ Enterprise Edition	Used for interconnect of heartbeat	N/A	N/A	21P3342
19K5788[3]	25ft Ethernet Crossover Cable	Interconnects 2 nodes without an ethernet switch	N/A	N/A	N/A

1. This Service offering is not available in all countries and is limited to selected areas (see Fax #8146 on 1-800-IBM-4FAX).
All final customer configurations and solutions require IBM Solution Assurance Approval.
2. Memory from the Required Options table must be ordered. Additional hardware may also be required, such as an ethernet switch and cables.
3. There may be some variance in IBM part numbers outside of the US and Canada.

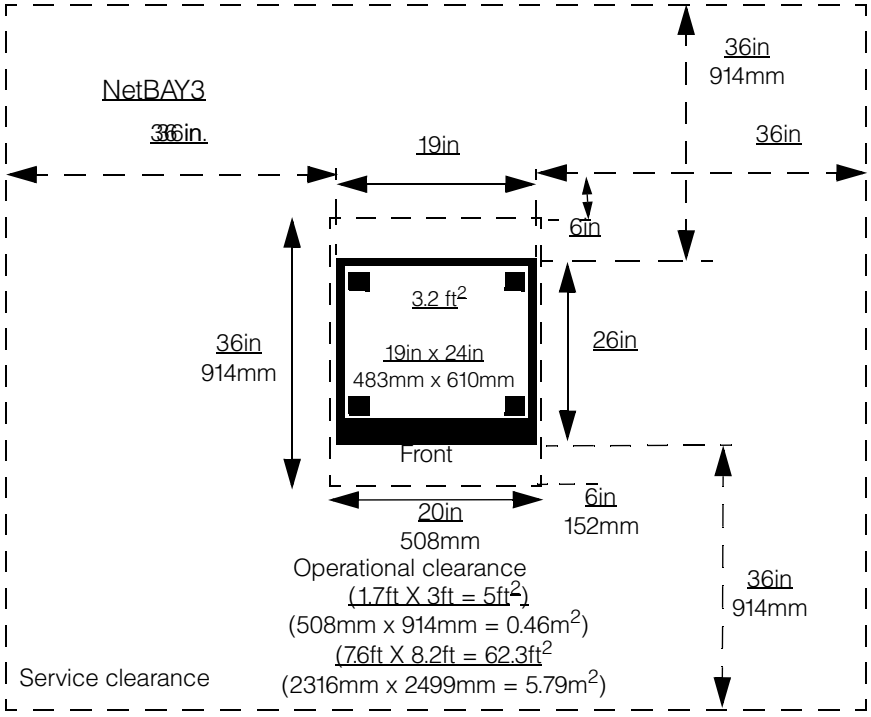
IBM Netfinity NetBAY3/NetBAY3E™ Stackable Enclosures

Sample Configuration



Installation Guidelines:

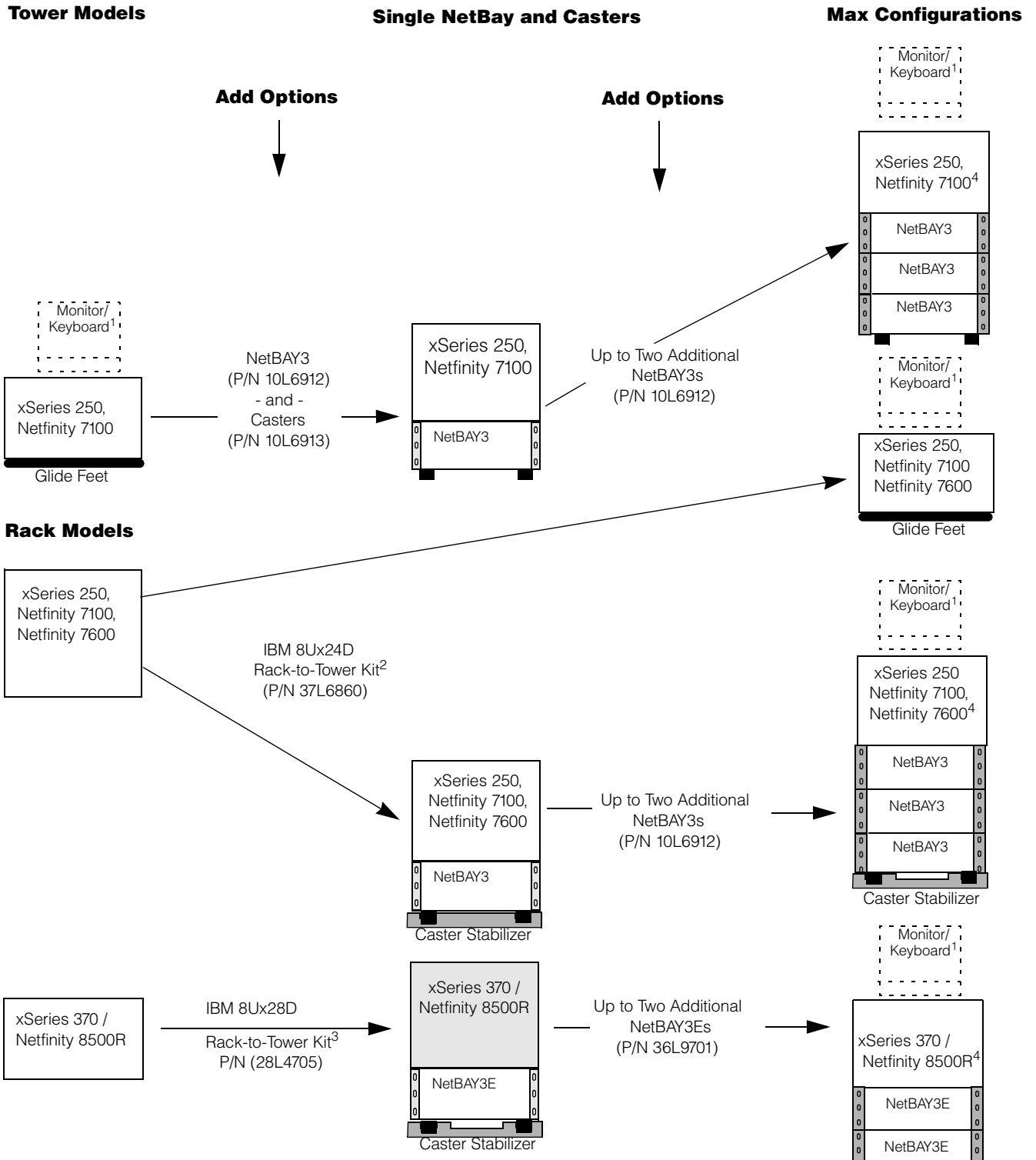
1) Locate power units with line cords in the bottom enclosure.
2) Install components starting from the bottom; start with the heaviest device.
3) If nothing is installed in the enclosure, attach the rear blank panel for stability.



Supported Devices	NetBAY3	NetBAY3E	Size (U)	Max/Enclosure	Max/Stack
Servers					
Netfinity 7600[1]	X	-	n/a	n/a	1
Netfinity 7100	X	-	n/a	n/a	1
xSeries 250	X	-	n/a	n/a	1
xSeries 370 / Netfinity 8500R[2]	-	X	n/a	n/a	1
Expansion[3]					
Netfinity EXP300	X	X	3	1	3
FAStT200 Storage Server	X	X	3	1	1
FAStT200 HA Storage Server	X	X	3	1	1
FAStT EXP500[4]	X	X	3	1	2
Tape Units[3]					
NetMEDIA 3551001	X	X	3	1	3
Power[3]					
APC Smart-UPS 1400RMB	X	X	3	1	1
APC Smart-UPS 3000RMB	X	X	3	1	1
100-120V PDU	X	X	1	1	1
200-240V PDU	X	X	1	1	1
NetBAY Server Dual Cord PDU	X	X	1	1	1
NetBAY Rack PDU	X	X	1	1	1
Communications[3]					
8230 T-R Controlled Access Unit	X	X	2	1	3
8235 Dial-in Access to LAN	X	X	1	3	9
8285 ATM Switch	X	X	3	1	3

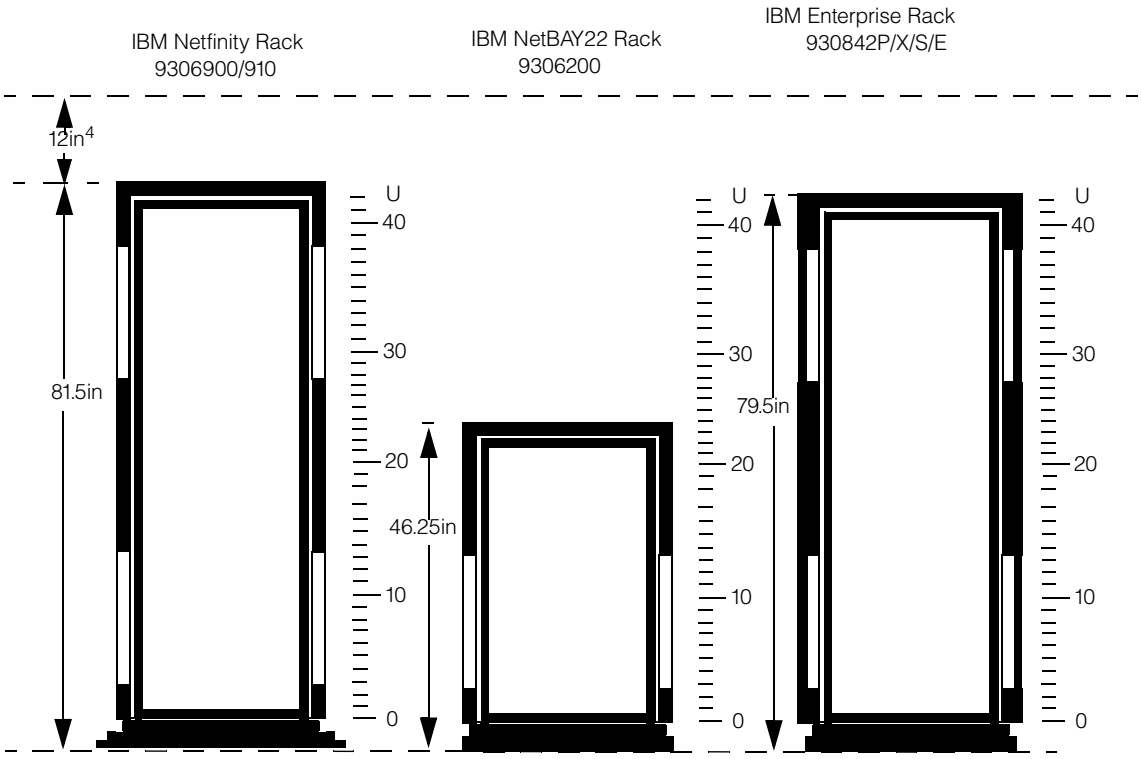
1. Netfinity 7600 systems are rack mountable and ship without a keyboard. In order to be utilized with a NetBAY3 (or in any tower configuration), optional 8Ux28D Rack-to-Tower Kit (P/N 28L4705) must be installed.
2. xSeries 370 / Netfinity 8500R systems are rack mountable and ship without a keyboard. In order to be utilized with a NetBAY3 (or in any tower configuration), optional Rack-to-Tower Kit (P/N 28L4705) must be installed.
3. NetBAY3 and NetBAY3E do not contain a top cover and require a supported server as the top component in a stack.
4. FAStT EXP500 requires a FAStT200 or FAStT200 HA Storage Server in a NetBAY3 or NetBAY3E configuration.

IBM Netfinity NetBAY3/3E Stackable Enclosure



1. xSeries / Netfinity rack models ship without a keyboard or mouse. Those supported for stacking on a NetBAY3 or NetBAY3E must have a rack-to-tower kit installed.
2. IBM 8Ux24D Rack-to-Tower Kit (P/N 37L6860) includes casters, caster stabilizer, glide feet and a single NetBAY3. Either NetBAY3 or the glide feet may be utilized but not both.
3. IBM 8Ux28D Rack-to-Tower Kit (P/N 28L4705) includes casters, caster stabilizer, and a single NetBAY3E.
4. xSeries 250, Netfinity 7100, Netfinity 7600 and xSeries 370 / Netfinity 8500R are not supported for installation with three empty NetBAY enclosures without a caster stabilizer.

Rack Cabinet and Options



	IBM Netfinity Rack[1]		IBM Netfinity NetBAY22[5]	IBM Netfinity Enterprise Rack		IBM NetBAY Enterprise Rack	
Machine Type / Model	9306900	9306910	9306200	930842P	930842X	930842S	930842E
EIA Capacity[6]	42U	42U	22U	42U	42U	42U	42U
Sidewall Compartments	4	4	2	4	4	4	4
Front Stabilizers	Std	Std	Std	Std	Std	Std	Std
Side Stabilizers	Std	Std	NR	NR	NR	NR	NR
Casters	Std	Std	Std	Std	Std	Std	Std
Leveling Feet	Std	Std	Std	Std	Std	Std	Std
Side Covers	94G6669	Std	Std	Std	NR	Std	NR
Glass Front Door	Std	No	Std	Std	Std	No	No
Perforated Front Door[2, 7]	06P6010	Std	No	06P6048	06P6048	Std	Std
Empty Weight	276lbs	276lbs	182lbs	575lbs	516lbs	575lbs	516lbs
Max Load (Moveable)	824lbs	824lbs	746lbs	1470lbs	1470lbs	1470lbs	1470lbs
Max Load (Stationary)	1424lbs	1424lbs	746lbs	1470lbs	1470lbs	1470lbs	1470lbs
Total Weight (Moveable)	1100	1100	928lbs	2045lbs	1986lbs	2045lbs	1986lbs
Total Weight (Stationary)	1700	1700	928lbs	2045lbs	1986lbs	2045lbs	1986lbs
Rack Extension Kit[1]	36L9703	36L9703	36L9702	NR	NR	NR	NR
Rack Attachment Kit	94G7446[3]	94G7446[3]	NA	NR	Std	NR	Std

NR - Not Required NA - Not Available

1. Rack Extension Kit adds 8in to rear of cabinet for cable management, recommended for systems greater than 24in in depth.
2. Option kit for use with installed racks. Improves air flow, recommended for 1U servers.
3. Required to attach racks together to make a suite.
4. Minimum clearance to the ceiling.
5. Display and keyboard may be placed on top of the NetBAY22.
6. Conforms to EIA 310 - D Standard 19in rack specification for a Type A cabinet with universal hole spacing.
7. Netfinity Direct special bid models are available with perforated front door (P/N 93084SA, 93084SB)

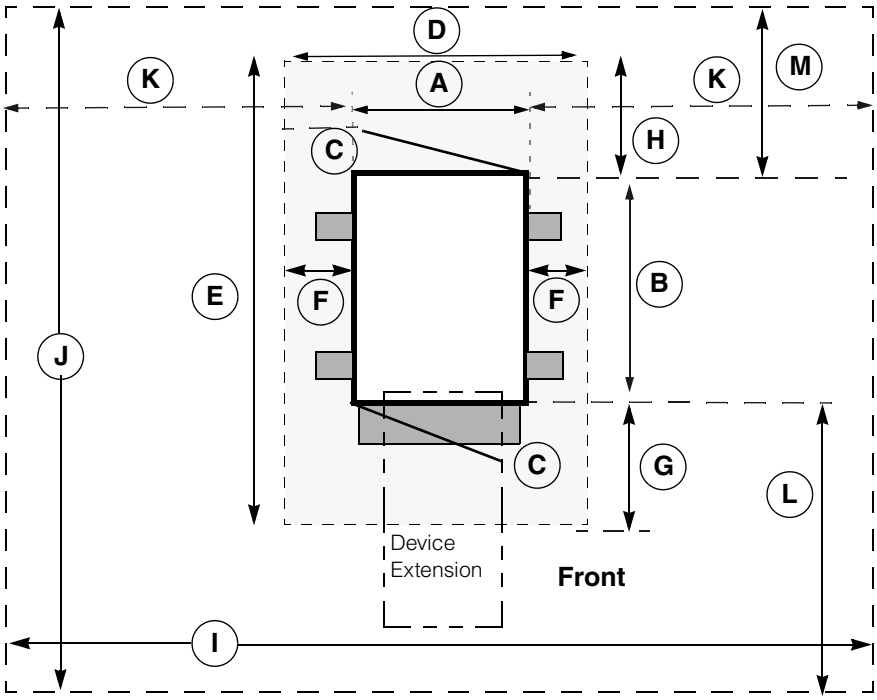
IBM Rack Mounted Units											
						Standard Power Cords[6]					
Description	**Machine Type / Model**	**Size (U)[4]**	**Approx Weight (lbs)**	**Power (Watts) Typical /Max (All cords to same source)**	**Number of P/S and Line Cords (basic/max**	**6ft NEMA 5-15P P/N 6952301**	**9ft NEMA 5-15P P/N 6952300**	**14ft NEMA 5-15P P/N 13F9961**	**9ft NEMA 6-15P P/N 1838574**	**9ft IEC 320-C14 P/N 36L8886**	**14ft IEC 320-C14 P/N 36L8861**
Server System Units											
x200[1]	8478	4	42	245/350	1/1	1					
x220[1]	8645	4	42	245/350	1/1	1					
x230/5100	8658	5	79	250/357	1/1	1					
x230/5100 w/Pwr Upgrade[5]	8658	5	79	315/450	1/3[5]	1					
x240/5600	8664	5	80	315/450	2/3	2					
x250	8665	8	123	350/475	2/4		2				
7100	8666	8	123	350/475	2/4		2				
7600	8665	8	123	350/475	3/4		3				
x330[2]	8654	1	29	140/200	1/1		1			1	
x340/4500R	8656	3	61	270/415	1/2		1			1	
x350/6000R	8682	3	76	365/525	1/3		1			1	
x370/8500R[3]	8681	8	160	1015/1450	3/3		3		3	3	
Storage Units											
EXP300	35311RU	3	90	285/360	2/2		2				
FAStT200	35421RU	3	56	275/390	2/2		2				
FAStT200HA	35422RU	3	56	275/390	2/2		2				
FAStT500 RAID Controller	35521RU	4	76	140/200	2/2		2				
FAStT EXP500 Storage Unit	35601RU	3	61	245/350	2/2		2				
FC Switch 8-port	2109S08	1	17	-/200	1/2		1				
FC Switch 16-port	2109S16	2	28	-/200	1/2		1				
Tape Units											
NetMEDIA	3551001	3	37	130/185	2/2	2					
DLT Library	3502R14	4	70	-/135	1/1	1					
Magstar 1 drive	3570C21	6	64	140/200	1/1			1			1
Magstar 2 drives	3570C22	6	64	140/200	2/2			2			2

1. Requires 4Ux20D Tower-to-Rack Kit (P/N 09N4300) to mount server unit into an EIA rack cabinet.
2. To provide adequate cooling, blank filler panel kit (P/N 94G6670) should be placed on the front of any unused rack space. If non-IBM racks are to be used, assure that both front and rear doors offer a minimum of 48% open area uniformly distributed and in line with installed servers. A clearance of 51 to 64mm (2 to 2.5in) must be maintained between the front of the door and the system unit's front bezel. The rear door must maintain the same or greater clearance. Nonrack or NetBAY3 installations are not supported.
3. x370 / 8500R requires installation of extension kit (P/N 36L9703 or 36L9702) when installed in a 9306-900, 910 or 9306-200, respectively, for proper rear door clearance.
4. 1U= 1.75in (44.45mm).
5. One power supply standard; the Hot-Swap Power Supply Upgrade Kit (P/N 37L6881) allows one to three hot swap power supplies.
6. Optional rack power cords: P/N 94G6667 - 14ft NEMA 5-15P; P/N 94G7448 - 14ft IEC 320-C147.

General rack placement rules and other information:
- Locate heaviest components at the bottom of the rack (i.e., UPS, then servers or storage, etc.).
- Do not extend more than one component on side rails at a time.
- Maximum of three UPSs (including no more than two APC 5000 UPSs) per rack.
- Utilize sidewall compartments for mounting PDUs and console switches prior to using EIA space.
- When mounting components in a rack, consider user and service requirements.
- When selecting length of power, console and storage cables, consider extension of cable management arms and overall cable routing.
- BTUs = Watts x 3.41.

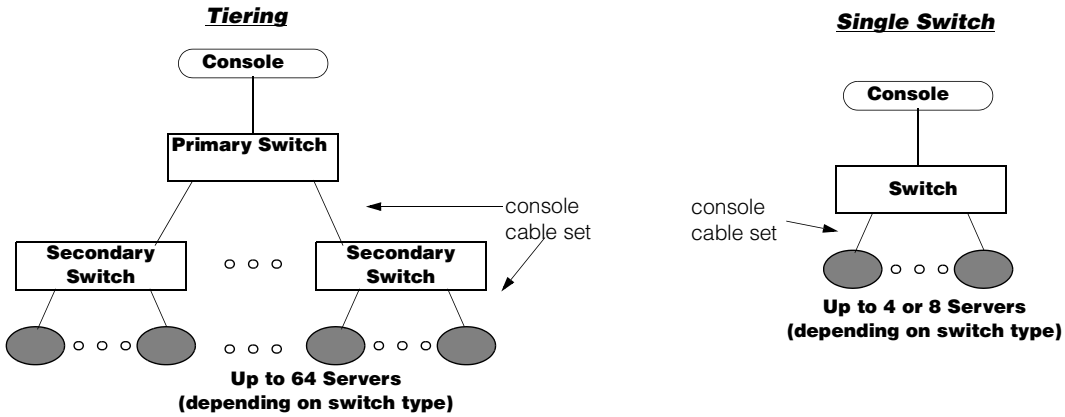
Power Supply Options						
			Standard Power Cords			
Power Supply	Part Number	Usable with	6ft NEMA 5-15P P/N 6952301	9ft NEMA 5-15P P/N 6952300	6ft NEMA 6-15P P/N 1838576	9ft IEC 320-C14 P/N 36L8886
110W	09L5403	2109		1		
250W	33L3760	x230, 5100, x240, 5600, 7100, x250, 7600	1			
270W	37L6880	x340, 4500R, x350, 6000R		1		1

Rack Options		
Part Number	Description	Information
28L4707	Netfinity Rack Keyboard Tray	Supports Keyboards in racks, also used with Flat Panel Monitor Rack Mount Kit II
01K1260	TrackPoint IV 104-key Black Keyboard	1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707)
28L3644	Space Saver II Keyboard	1U, includes TrackPoint IV, requires Rack Keyboard Tray (P/N 28L4707)
94G7444	Monitor Compartment	
633347N	E51 Color Monitor	9U, requires Monitor Compartment (P/N 94G7444)
6331N2N	E54 Color Monitor	9U, requires Monitor Compartment (P/N 94G7444)
6332J1N	E74 Color Monitor	10U, requires Monitor Compartment (P/N 94G7444)
37L6888	Flat Panel Monitor Rack Mount Kit II	Requires Rack Keyboard Tray (P/N 28L4707)
9511AG1	T54A Flat Panel Color Monitor	3U, requires Flat Panel Monitor Rack Mount Kit II (P/N 37L6888)
09N4290	NetBAY 1 x 4 Console Switch	1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to four servers, one console
09N4291	NetBAY 2 x 8 Console Switch	1U, mounts in sidewall compartments, EIA space or Monitor Compartment; supports one to eight servers, two consoles (only one console when installed in the Monitor Compartment)
09N4293	Console Cable Set - 7ft	Connects servers to console switch
94G7447	Console Cable Set - 12ft	Connects servers to console switch
94G6666	100-120V Power Distribution Unit	1U, 100-120V, 12A, mounts in sidewall compartment or EIA space, eight NEMA 5-15R outlets, requires one L5-15R wall receptacle
37L6866	NetBAY Rack PDU (US)	1U, 100-240V, 15A, mounts in sidewall compartment or EIA space, seven IEC 320-C13 outlets, requires one NEMA L5-20R or L6-20R wall receptacle
37L6865	NetBAY Server Dual-cord PDU (US)	1U, 100-240V, 15/10A, mounts in sidewall compartment or EIA space, four IEC 320-C13 outlets, requires two NEMA L5-20R or L6-20R wall receptacles
37L6883	NetBAY 100-127V Single-phase Front-end PDU (US)	1U, 100-127V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L5-30R wall receptacle
37L6884	NetBAY 200-240V Single-phase Front-end PDU(US)	1U, 200-240V, shared 20A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L6-30R wall receptacle
37L6886	NetBAY 3-phase Front-end PDU (US)	1U, 380-415V, shared 30A, mounts in sidewall compartment, three IEC 320-C19 outlets, requires one NEMA L21-30R wall receptacle
94G6674	APC Smart-UPS 1400RMB	3U, 120V, 10A, six NEMA 5-15R outlets, requires one NEMA L5-15R wall receptacle
94G6676	APC Smart-UPS 3000RMB	3U, 120V, 23A, eight NEMA 5-15R outlets, requires one NEMA L5-30R wall receptacle
37L6861	APC Smart-UPS 5000RMB	5U, 208V, 22A, eight IEC 320-C13 outlets, two IEC 320-C19 outlets, reqires one NEMA L6-30R wall receptacle; ships standard with two IEC 320-C19 to C20 cables to support PDUs.
94G7446	Rack Attachment Kit	Used to attach 9306-900, 910 racks to make a suite
94G6669	Side Panel Kit	Used with 9306-900 only
06P6010	Netfinity Perforated Door Kit	Used with 9306-900 only
06P6048	Netfinity Enterprise Perforated Door Kit	Used with 9308-42P, 42X only
94G6670	Blank Filler Panel Kit	Consists of one 5U, one 3U, and two 1U blank filler panels
94G7442	Fixed Shelf	Supports up to 100lbs
94G6667	Rack Power Cord -Type A14	IEC 320-C13 to NEMA 5-15P (14ft)
94G7448	Rack Power Cord -Type C12	IEC 320-C13 to IEC 320-C14 (14ft)

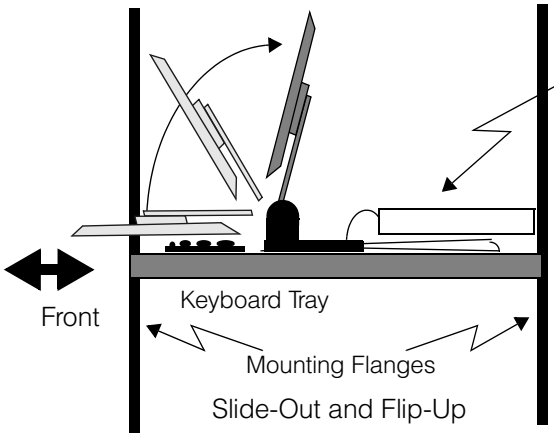


	9306-xxx (inches)	9308-xxx (inches)	Description
Box Footprint			
A	23.5	25.5	Width of rack
B	34.5	43.5	Depth of rack (not including front stabilizer)
C	24	26	Front and rear door clearance
Operational Clearance			
D	27.5	29.5	Width of Operational Clearance area
E	88.5	110	Depth of Operational Clearance area
F	2	2	Left/Right sides of rack to Operational Clearance area
G	30	36	Front of rack to Operational Clearance area
H	24	26	Rear of rack to Operational Clearance area
Service Clearance			
I	95.5	97.5	Width of Service Clearance area
J	130.5	133.5	Depth of Service Clearance area
K	36	36	Left/Right sides of rack to Service Clearance area
L	60	60	Front of rack to Service Clearance area
M	30	30	Rear of rack to Service Clearance area

Switch Arrangements



Keyboard/Pointer/Monitor & Switch … all in 3U



Console Switch
- Mounts to rear flanges
- Shares 3U space with display, keyboard and tray

Keyboard Tray Components
- 28L4707 Netfinity Rack Keyboard Tray
- 37L6888 Netfinity Flat Panel Monitor Rack Mount Kit II
- 28L3644 Space Saver Keyboard
- 9511AG1 T54A TFT Color Monitor

Appendix A: Tape Drive Attributes

LEGEND:

HH: Half-High - approx height of 1.6in
SL: Slim-Line - approx height of 1in
FH: Full-High

Part Number	Description	SCSI Interface (bit)	Form Factor	Max GB-Native/Compr.[2]	MB/sec - Native/compr.[2]	Termination Incl	68/50-pin Converter Incl	Internal Cables	Data/Cleaning Cartridges Included	Ext'l Tape Enclosures[1]
	Tape Drives									
20L0549	10/20GB TR5 Internal IDE Tape Drive	-	89mm (3.5in) SL or 133mm (5.25in) HH	10/20	1/2	-	-	-	1/0	-
09N4041	12/24GB DDS/3 4mm Internal SCSI Tape Drive	8	89mm (3.5in) HH or 133mm (5.25in) HH	12/24	1.1/2.2	Y	Y	-	1/1	3510020, 3551001
00N7991	20/40GB DDS/4 4mm Internal Tape Drive	16 Ultra2 LVD	89mm (3.5in) HH or 133mm (5.25in) HH	20/40	2.75/5.5	N	N/A	-	1/1	3510020[4], 3551001[3]
09N4042	10/20GB NS Internal SCSI Tape Drive	8	89mm (3.5in) SL or 133mm (5.25in) HH	10/20	1/2	Y	Y	-	1/0	3510020, 3551001
09N4040	20/40GB DLT Internal SCSI Tape Drive	8	133mm (5.25in) FH	20/40	1.5/3	N	Y	-	1/1	3503BOX[4], 3551001
00N7990	40/80GB DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	40/80	6/10	N	N/A	-	1/1	3503B0X[4], 3551001[3]
00N8017	60/120GB 8mm M2 SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	60/120	12/24	N	N/A	-	1[13]	3551001[3] 3510020[4]
00N8016	100/200GB LTO Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	100/200	15/30	N	N/A	-	1/1	3551001[3]
24P2396	100/200GB LTO Half-High Tape Drive	16 Ultra2 LVD	133mm (5.25in) HH	100/200	8/16	N	N/A	-	1/1	3551001[3]
00N8015	110/220GB Super DLT Internal SCSI Tape Drive	16 Ultra2 LVD	133mm (5.25in) FH	110/220	11/22	N	N/A	-	1/1	3551001[3]
	Associated Options									
00N7956	68-pin External Multimode LVD/SE SCSI Terminator	16 LVD/SE	Ext	-	-	Y	N	-	-	3510020, 3503B0X
36L9636	Netfinity Two-Drop Internal SCSI Cable[5]	16	Int	-	-	Y	N	16-bit, 2-drop	-	-
10K2340	Media Bay Tray and LVD Cable Kit[6]	16 LVD	Int	-	-	Y	N	16-bit 2-drop	-	3551001
	Tape Autoloaders									
3502108	DLT Tape Autoloader	16	Desktop	280/560	5/10	Y	-	-	1/1	-
00N7992	120/240GB DDS/4 Tape Autoloader	16 Ultra2 LVD	133mm (5.25in) FH	120/240	3/6	N	N	-	5/1	3551001
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[7]	16 Ultra2 LVD	Tower or 6U Rack	900/1.8TB	15/30	Y	N		1/1	
	External Tape Enclosures									
3510020	External Half High SCSI Storage Enclosure[8]	8, 16	Desktop	-	-	N	N	8-bit or 16-bit	-	-
3551001	NetMEDIA Storage Expansion Unit EL[9]	16	Rack	-	-	Y	N	2 x 16-bit, 4-drop	-	-
10L7113	NetMEDIA Systems Management Adapter[10]	16	-	-	-	N	N	N	-	3551001
3503B0X	DLT External SCSI Enclosure[11]	16	Desktop	-	-	N	N	16-bit	-	-
	External Tape Libraries[12]									
3502x14	DLT Tape Library	16	Desktop or Rack	490/980	5/10	Y	-	-	1/1	-
3570C2x	Magstar MP 3570 Tape Subsystem	Diff	6U Rack	100/300	2.2/6.6 or 7.0/15.0	Y	-	-	1/1	-
3600xxx	3600 Series LTO Tape Libraries and Expander Module	16 Ultra2 LVD	Tower or Rack	2TB/4TB	15/30	Y		-	1/1	-

1. To determine cable requirements, note the tape drive's SCSI interface, the appropriate SCSI controller from the system configurator section and the desired enclosure then refer to Appendix D: Cables - Storage Units - Controllers. For installation of an internal tape drive into a server, see the appropriate system section.
2. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
3. LVD support for LVD devices installed in a NetMEDIA Storage Expansion Unit EL (P/N 3551001) requires replacement of the standard single-ended internal cables with one or more (depending on configuration) cables from Media Bay Tray and LVD Cable Kit (P/N 10K2340) which contains a single two-drop multi-mode terminated cable. If the standard cables are used for attachment to LVD devices, single-ended SCSI rules and bus speeds apply.
4. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).5.
5. Netfinity Two-Drop Internal SCSI Cable (P/N 36L9636) is a single-ended wide two-drop terminated cable.
6. Media Bay Tray and LVD Cable Kit (P/N 10K2340) includes an internal two-drop multi-mode terminated LVD SCSI cable.
7. If installed in a rack, a fixed shelf is required.
8. Provides a black desktop 5.25in half-high (HH) tape enclosure. Connector is configurable as 50-pin Centronix or 68-pin high density. Requires either tape drive self-termination or 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
9. NetMEDIA Storage Expansion Unit EL (P/N 3551001) is a black 3U, 19in rack or NetBAY3/3E mountable tape enclosure which includes two full high (FH) or four half-high (HH) extended length 5.25" bays, two external 68-pin high density connectors and two internal four-drop single-ended terminated 16-bit SCSI cables for device attachment. Two power supplies and two power cords are also included. Tip: The front rail clips will need to be reversed and screwed in from behind to secure the unit in a 930842x rack.
10. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12M when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
11. Provides a black desktop DLT tape enclosure, with a 68-pin high density external connector. Requires termination by the tape drive or by installation of 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
12. Tape library attributes and prerequisites are located in Appendix B: Tape Library Attributes.
13. A combination data/clean cartridge cleans the drive each time the data cartridge is used.

Note: Tape support varies by system depending on internal bay availability, SCSI cabling type, number of cable drops, existence of a RAID controller and availability of a suitable external enclosure. The following general rules should be followed.
a) Tapes are not supported for attachment to RAID controllers.
b) Single-ended (non-LVD) devices may be attached to internal multi-mode terminated cables. The entire SCSI bus will be limited to single-ended operation with a maximum bus speed of Ultra-SCSI.
c) LVD devices attached to single-ended terminated cables will operate in single-ended mode with a maximum bus speed of Ultra-SCSI.

Internal SCSI Cables and Optional SCSI Adapters
Most systems support the following SCSI adapters for use with tape. Consult the I/O Options table in the system sections for specific system support. Where tapes are supported internal to the system, the cables which ship with the adapters are supported for tape attachment. Some restrictions may apply based on cable and tape type which are explained in the note above.

Part Number	Description	Cable Description
02K3454	PCI Fast/Wide Ultra SCSI Adapter	Four-drop, single-ended terminated, 16-bit
19K4646	PCI Wide Ultra160 SCSI Adapter	Five-drop, multi-mode terminated
36L9636	Netfinity Two-Drop Internal SCSI Cable	Two-drop, single-ended terminated, 16-bit
10K2340	Media Bay Tray and LVD Cable Kit	Two-drop, multi-mode terminated

Appendix B: Tape Library Attributes

SCSI Interface and Cable Legend
M: Male - External
68: 16-bit, 68-pin High Density connector
0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
SE: Single-ended SCSI
HVD: High Voltage Differential SCSI
LVD: Low Voltage Differential SCSI

Part Number	Description	SCSI Interface	Form Factor	Terminator Included	External Cables Incl (m)	SCSI Controllers Incl	Data Cartridges std/max	Cleaning Cartridges std	Cartridge Mags std/max	Qty of drives - std/max	Max GB-Native/Compressed	MB/sec - Native/compr.[1]
DLT Tape Libraries												
3502314	DLT Tape Library - Tower	SE	Desktop	Y	M68-M68 (3M)	Y	1/14	1	2/2	1/3	490/980	5/10
3502R14	DLT Tape Library - Rack[2]	SE	4U Rack	Y	M68-M68 (3M)	Y	1/14	1	2/2	1/3	490/980	5/10
33L4979	DLT Library Drive Upgrade[3]	SE	-	N	Jumper	N	-	-	-	-	-	5/10
3600 Series Tape Libraries												
3600220	3600 Series 2/4TB LTO Tape Library (Tower)	LVD	Tower	Y	-	N	1/20	1	4/4	1/2	2TB/4TB	15/30
3600R20	3600 Series 2/4TB LTO Tape Library (Rack)	LVD	5U Rack	Y	-	N	1/60	1	4/4	1/6[7]	6TB/12TB[7]	15/30
3600LXU	3600 Series 2-Drive, 20-Cartridge Expander Module[4]	LVD	5U Rack	Y	-	N	0/20	1	4/4	0/2	2TB/4TB	15/30
3600109	3600 Series 900GB/1.8TB LTO Tape Autoloader[5]	LVD	Tower or 6U Rack	Y	-	N	1/9	1	1/1	1/1	900/1.8TB	15/30
09N4048	3600 Series LTO Drive Upgrade Option[6]	LVD	-	N	Jumper	N	-	-	-	-	-	8/16
Magstar Tape Systems												
3570C21	Magstar MP 3570 Tape Subsystem[8]	HVD	6U Rack	Y	(4.5M)	Y	1/20	1	2/2	1/2	100/300	7.0/15.0
3570C22	Magstar MP 3570 Tape Subsystem[8]	HVD	6U Rack	Y	(4.5M)	Y	1/20	1	2/2	2/2[13]	100/300	7.0/15.0
08L6517	3570 Adapter Card Kit[9]	HVD	-	Y	(4.5M)	Y	-	-	-	-	-	-
08L6480	Second "C" Drive for C21[10]	HVD	-	-	-	N	-	-	-	-	-	7.0/15.0

SCSI Interface and Cable Legend

M: Male - External
68: 16-bit, 68-pin High Density connector
0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
SE: Single-ended SCSI
HVD: High Voltage Differential SCSI
LVD: Low Voltage Differential SCSI

Part Number	Description	SCSI Interface	Form Factor	Terminator Included	External Cables Incl (m)	SCSI Controllers Incl	Data Cartridges std/max	Cleaning Cartridges std	Cartridge Mags std/max	Qty of drives - std/max	Max GB-Native/Compressed	MB/sec - Native/compr[1]
Magstar MP Media[11]												
05H2462	Magstar MP Fast Access Linear Tape Cartridge, B-format[12]	-	-	-	-	-	-	-	-	-	-	-
05H2463	Magstar MP Cleaning Cartridge	-	-	-	-	-	-	-	-	-	-	-
08L6187	Magstar MP Fast Access Linear Tape Cartridge, C-format	-	-	-	-	-	-	-	-	-	-	-

1. Transfer rates are for single SCSI channel configurations. Tape libraries utilizing split library or dual host configurations may obtain higher rates. Data compression typically provides a 2X improvement in capacity and transfer rate, but since data compression is affected by many factors, actual improvements may be more or less than 2X.
2. Includes Fixed Shelf (P/N 94G7442) for installation in an IBM rack or NetBAY22.
3. Upgrade 33L4979 is an additional drive for 3502x14 DLT Tape Libraries. Up to two drive upgrades may be installed for a maximum of three drives per 3502x14.
4. Supported only with the 3600 Series LTO Tape Library (rack) (P/N3600R20). Allow one additional EIA space when installing either one or two units to accommodate a filler plate for cable routing.
5. If installed in a rack, a fixed shelf is required.
6. Install in second drive bay of 3600 Series LTOTtape Libraries or in open bays of 3600 Series 2-drive, 20-cartridge Expander Module to increase performance. Includes an LTO (Ultrium) drive and a one-meter external LVD SCSI cable. Minimum of one required to support basic tape function fo each Expander Module.
7. Maximum configuration includes two 3600 Series 2-Drive, 20-Cartridge Expander Modules (P/N 3600LXU).
8. Includes rack mounting hardware and two power cords (120V and 250V). Models B22 and C22 include an additional two power cords.
9. Required for Dual Host or Split Library configurations with 3570B2x or 3570C2x containing two drives.
10. Required for either dual host or split library operation. Should be installed by qualified service personnel.
11. Magstar MP Media can be ordered by calling 888-IBM-MEDIA or 888-426-6334 in the US, Canada, or Puerto Rico.
12. B-format tape cartridges can be used in either Magstar MP 3570 Model B or C tape drives.
13. The two tape drives are daisy-chained on the same SCSI bus with an included 0.5m SCSI cable. Dual Host and Split Library configurations require 3570 Adapter Card Kit (P/N 08L6517).

Appendix C: UPS Runtime Estimate (minutes)

Servers	# Pwr Cords Std/Max	Watts Load Max/Typ[1]
Netfinity 1000[2, 3]	1/1	225/160
Netfinity 3000[2]	1/1	225/160
Netfinity 3500 M20[2]	1/1	430/300
Netfinity 4000R[2]	1/1	150/105
xSeries 200[2]	1/1	350/245
xSeries 220[2]	1/1	350/245
xSeries 230 / Netfinity 5100[2]	1/3	450/315
xSeries 240 / Netfinity5600[2]	2/3	450/315
xSeries 330[2]	1/1	200/140
xSeries 340 / Netfinity4500R[2]	1/2	390/270
Netfinity 6000R[2]	1/4	525/365
Netfinity 7100[2]	2/4	475/330
Netfinity 7600[2]	3/4	475/330
Netfinity 8500R[2]	3/3	1450/1015
Other Devices		
Netfinity Fibre Channel RAID Controller Unit (3526)[2]	2/2	160/105
FAStT500 Storage Server (3552)[2]	2/2	200/140
FAStT EXP500 Storage Expansion Unit (3560)[2]	2/2	350/245
FAStT200 Storage Server (35421RU)[2]	2/2	390/275
FAStT200 HA Storage Server (35422RU)[2]	2/2	390/275
Netfinity EXP200 Storage Expansion Unit (3530)[2]	1/2	350/280
EXP300 Storage Expansion Unit (3531)[2]	2/2	360/285
SAN Fibre Channel Switch, 8-port (2109S08)	1/2	200/n/a
SAN Fibre Channel Switch, 16-port (2109S16)	1/2	200/n/a
SAN Data Gateway Router (Diff.) (2108R3D)	1/1	90/n/a
SAN Data Gateway Router (SE) (2108R3S)	1/1	90/n/a
DLT Tape Autoloader and Library (3502)	1/1	135/n/a
Magstar MP 3570 Tape Subsystem (C2x)	1/1	200/140
NetMEDIA Storage Expansion Unit EL (3551)	2/2	185/130

1. This table represents general guidelines for selecting the appropriate UPS based on minimum and typical runtime estimates. A 'maximum configuration' load will result in 'minimum' UPS runtime. 'Typical' loads are based on a production system running at approximately 70% of maximum capacity. The 'typical' loads represent a more likely configuration and is a more likely estimate of runtime. Customer environments are unique and are unlikely to be precisely represented by any of the specific entries in the table.
2. Power-Factor Corrected (PFC) power supply.
3. Netfinity 1000 (all models) are not available in Canada or Latin America. Netfinity 1000 (IDE models only) are available in the United States.

		Tower				Rack Mounted		
	INT'L P/N	**SU-700iNET 94G4073**	**SU-1000iNET 94G4074**	**SU-1400iNET 94G4075**	**SU-2200iNET 94G4076**	**SU-1400RMiB 94G6675**	**SU-3000RMiB 94G6677**	**SU-5000RMiB 37L6862**
	US P/N	**SU-700NET 94G3134**	**SU-1000NET 94G3135**	**SU-1400NET 94G3136**	**Not Available**	**SU-1400RMB 94G6674**	**SU-3000RMB 94G6676**	**SU-5000RMB 37L6861**
UPS Attributes								
Communications Links to Servers		1	1	1	1	1	3	3
Color		black	black	black	white	black	black	black
EIA Height		-	-	-	-	3U	3U	5U
International Models								
50 or 60Hz, single phase, VAC:		220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (208)[2]	220-240 (xxx)[2, 3]
10-Amp, IEC 320-C13 (Device) receptacles		4	4	4	8	4	8	8
16-Amp, IEC 320-C19 (PDU 94G7450) receptacles		-	-	-	1	-	1	2
Line Cord Receptacle (IEC 320-)		C14	C14	C20	C20	C14	C20	TB[5]
US Models								
50 or 60Hz, single phase, VAC:		120 (120)[2]	120 (120)[2]	120 (120)[2]	-	120 (120)[2]	120 (120)[2]	200-220 (208)[2]
Receptacles (NEMA 5-15R)		4	6	6	-	6	8	-
10-Amp, IEC 320-C13 (Device) receptacles		-	-	-	-	-	-	8
16-Amp, IEC 320-C19 (PDU 94G7450) receptacles		-	-	-	-	-	-	2[4]
Line Cord Length, NEMA Plug		6ft, 5-15P	6ft, 5-15P	6ft, 5-15P	-	6ft, L5-15P	6ft, L5-30P	8ft, L6-30P

1. Data provided by APC.
2. How-to-Read example for 220-240(208): Input VAC is 220-240 as is the UPS output when electric service is active. When electric service is interrupted and the UPS is on battery the UPS output is 208 VAC.
3. Battery output may be set to 220, 225, 230, or 240 VAC.
4. Two PDU jumper cables ship with the UPS for attachment from the IEC 320-C19 receptacles to Power Distribution Units (PDU) (P/N 94G7450).
5. SU-5000RMiB (P/N 37L6862) contains a Terminal Block (TB) for direct attachment to an electrical source by qualified personnel.

	Total Configuration Runtime Estimator (Time in minutes)[1]						
	Tower				**Rack Mount**		
International Part Number	**SU-700iNET 94G4073**	**SU-1000iNET 94G4074**	**SU-1400iNET 94G4075**	**SU-2200iNET 94G4076**	**SU-1400RMiB 94G6675**	**SU-3000RMiB 94G6677**	**SU-5000RMiB 37L6862**
United States Part Number	**SU-700NET 94G3134**	**SU-1000NET 94G3135**	**SU-1400NET 94G3136**	**Not Available**	**SU-1400RMB 94G6674**	**SU-3000RMB 94G6676**	**SU-5000RMB 37L6861**
Total Load (Watts)	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**	**Runtime Minutes**
200	22	38	62	130	45	104	240
250	17	28	43	104	34	84	200
300	12	22	34	85	25	70	166
350	9	18	29	71	22	58	145
400	7	14	23	65	18	52	125
450	5	12	20	52	15	45	110
500	-	11	18	43	13	38	97
550	-	9	16	38	11	35	87
600	-	8	13	34	10	31	76
650	-	7	12	31	9	29	68
700	-	6	11	28	8	26	63
750	-	-	10	25	8	24	59
800	-	-	9	23	7	22	55
850	-	-	8	21	7	20	51
900	-	-	7	19	6	18	47
950	-	-	6	18	5	17	43
1000	-	-	-	17	-	16	39
1100	-	-	-	15	-	14	34
1200	-	-	-	13	-	12	31
1300	-	-	-	11	-	10	28
1400	-	-	-	9	-	9	25
1500	-	-	-	9	-	8	22
1600	-	-	-	8	-	8	20
1700	-	-	-	-	-	7	18
1800	-	-	-	-	-	-	17
1900	-	-	-	-	-	-	14
2000	-	-	-	-	-	-	12
2100	-	-	-	-	-	-	11
2200	-	-	-	-	-		11
2300	-	-	-	-	-	-	10
2400	-	-	-	-	-		10
2500	-	-	-	-	-	-	9
2600	-	-	-	-	-		9
2700	-	-	-	-	-	-	8
2800	-	-	-	-	-	-	8

1. Data provided by APC.

Steps:
1. Identify the devices contained in the configuration.
2. Sum the load (watts) of all devices in the configuration. Use either Maximum Load for minimum runtime or Typical Load for typical runtime.
3. Find the Total Configuration Load in the table above.
4. Select the most appropriate UPS model to achieve the desired runtime.
NOTE: If the Total Configuration Load is greater than the entries above, split the load across two or more UPS units.

Appendix D: SCSI Cables – Storage Units – Controllers

F: Female - External
M: Male - External
I: Internal
68: 16-bit, 68-pin High Density connector
50: 8-bit, 50-pin Centronix Connector
0.8: 16-bit, 68-pin Very High Density Connection Interface (VHDCI) 0.8mm connector
16: 16-bit, 68-pin connector
8: 8-bit, 50-pin connector

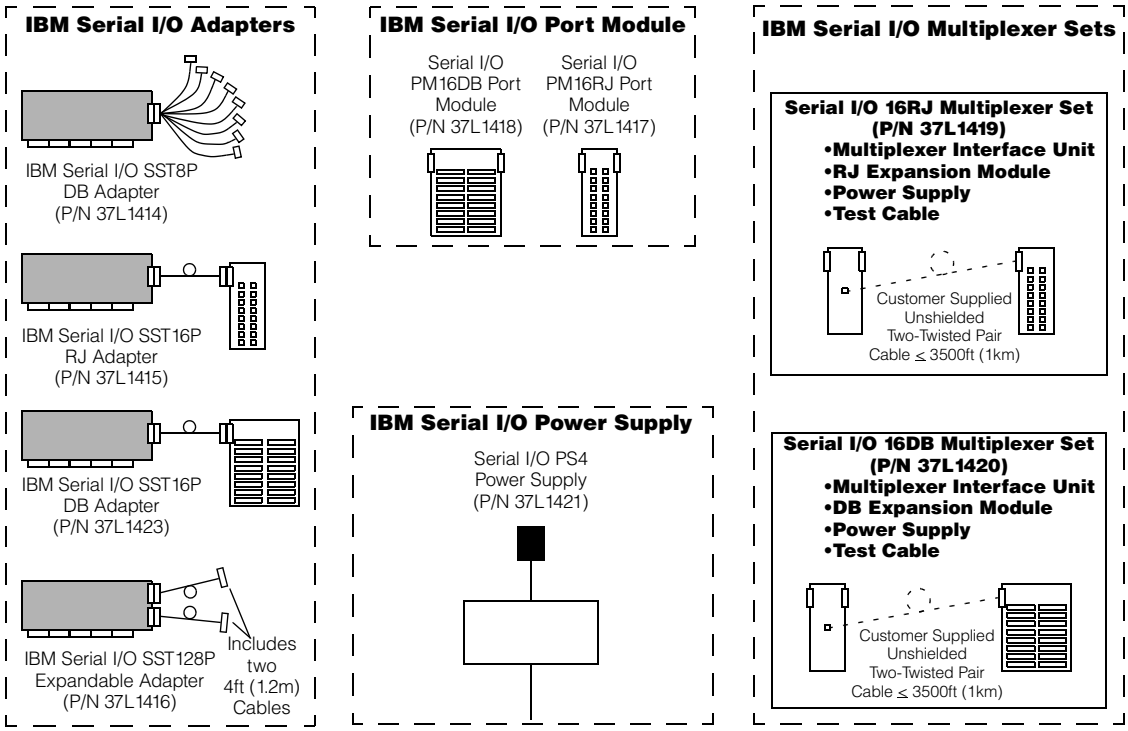
Instructions: Identify Desired Controller Row and Storage Unit Column. The intersection of row and column contains the cable group letter which supports the connection. Go to the cable group under the corresponding storage unit for specific support. Read all Notes for row, column, and any cable group footnotes.

Storage Unit	35311RU	3510020	3503B0X	3551001	Adapter 10L7113
Max MB/sec.[1]	160	-	-	-	-
LVDS	X	-	-	-	-
Connector Type	F0.8	F68 or F50	F68	F0.8	F0.8

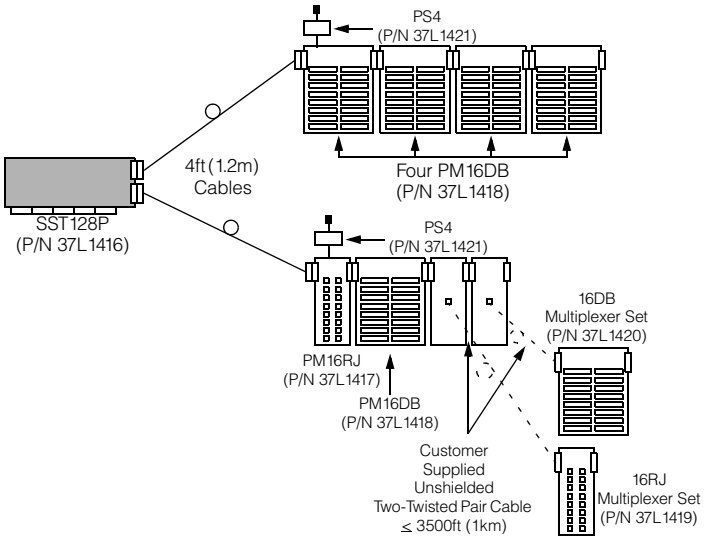
Description	Part Number	Max/ Channel (MB/sec)[1]	LVDS	Connector Type/ Max	Note #	2, 3	4	4, 5	2, 4	2, 4, 6
RAID Storage Controllers										
ServeRAID-4L Ultra160 SCSI Controller	37L6091	160	X	F0.8/1	8	A	-	-	-	-
ServeRAID-4M Ultra160 SCSI Controller	37L6080	160	X	F0.8/2	8	A	-	-	-	-
ServeRAID-4H Ultra160 SCSI Controller	37L6889	160	X	F0.8/4	8	A	-	-	-	-
Ultra160 SCSI Controllers										
PCI Wide Ultra160 SCSI Adapter	19K4646	160	X	F0.8/1		-	-	B	A	A
xSeries 350 / Netfinity 6000R - Ultra160 SCSI	Onboard	160	X	F0.8/1		-	-	-	A	A
Ultra2 SCSI Controllers										
xSeries 240 / Netfinity 5600	Onboard	80	X	F0.8/1		-	B	B	A	A
xSeries 250	Onboard	80	X	F0.8/1		-	B	B	A	A
Netfinity 7100	Onboard	80	X	F0.8/1		-	B	B	A	A
Netfinity 7600	Onboard	80	X	F0.8/1	9	-	B	B	A	A
xSeries 370 / Netfinity 8500R	Onboard	80	X	F0.8/1	-	-	B	B	A	A
Ultra SCSI Controllers										
PCI Fast/Wide Ultra SCSI Adapter	02K3454	40	-	F68/1	-	-	C	C	B[14]	B[14]
No Onboard External Port[24]										
xSeries 200	Onboard	-	-	n/a		-	-	-	-	
xSeries 220	Onboard	-	-	n/a		-	-	-	-	-
xSeries 330	Onboard	-	-	n/a		-	-	-	-	-
xSeries 340 / Netfinity 4500R	Onboard	-	-	n/a		-	-	-	-	-
xSeries 230 / Netfinity 5100	Onboard	-	-	n/a		-	-	-	-	-
Cable Group A (M0.8-M0.8)										
Netfinity 2M Ultra2 SCSI Cable	03K9310	-	X	M0.8-M0.8	11	X[12]	-	-	X	X
Netfinity 4.2M Ultra2 SCSI Cable	03K9311	-	X	M0.8-M0.8	11	X	-	-	X	X
Netfinity 20M Ultra2 SCSI Cable	37L7101	-	X	M0.8-M0.8	7	X	-	-	-	-
Cable Group B (M68-M0.8)										
1M External 0.8mm SCSI Cable	76H3589	-	-	M68-M0.8		X	X	X	X[14]	X[14]
2M External.8mm SCSI Cable	01K8027	-	-	M68-M0.8		X	X	X	X	X
Cable Group C (M68-M68)										
PC Server F/W to F/W External SCSI Cable-1m	70G9857	-	-	M68-M68	14	-	X	X	-	-
Cable Group G (Other)										
68-pin External Multimode LVD/SE SCSI Terminator	00N7956	-	-	M68		-	X	X	-	-

1. Maximum supported speeds may be limited by installation of lower speed devices, controllers or cable lengths greater than two meters.
2. Rack installation cable management requires devices to have a minimum cable length of two meters. Cable length requirements will vary based on placement within a single or multiple rack suite.
3. Maximum speeds may be limited by the installed devices or SCSI controller.
4. Daisy chaining tape enclosures is not supported at this time.
5. Requires 68-pin External Multimode LVD/SE SCSI Terminator (P/N 00N7956).
6. NetMEDIA Systems Management Adapter (P/N 10L7113) may be installed in a 3551001 to provide repeater function, LVDS interface, aggregate cable lengths up to 12 meters when attached to an LVD SCSI controller, and auto-termination when the 3551001 is powered off. External connector is 0.8mm VHDCI.
7. Cable lengths exceeding 4.3 meters are NOT supported for attachment to non-Ultra2 or Ultra160 controllers.
8. Maximum speeds may be limited by the enclosure or its installed devices.
9. Netfinity 7600 also includes an onboard controller equivalent to a Netfinity ServeRAID-4M Ultra160 SCSI Adapter (P/N 37L6080). See ServeRAID-4M for connectivity requirements.
10. Does not support external attachment of SCSI devices attached to optional controllers.
11. Supports attachment to Ultra2 or single-ended SCSI controllers with operational speeds of up to Ultra2. Controller, storage unit, cable length or storage device limitations may apply (see Max MB/sec row and column above).
12. EXP300 (P/N 35311RU) includes a single 2M Ultra2 SCSI cable similar to Netfinity 2M Ultra2 SCSI Cable (P/N 03K9310).
13. No external SCSI port is available on these systems. A supported optional controller must be installed. See the systems section to determine which controllers and external storage units are supported then refer back to this table for cable requirements using the controller row. The Netfinity 4000R does not support customer installation of adapters that must be installed inside the server. Nonstandard features must be installed at the factory. Contact your IBM Marketing Representative for more information.
14. Not supported for use in a rack. Rack installations require a minimum cable length of two meters.

Appendix E: IBM Serial I/O


IBM Serial I/O Adapters
IBM Serial I/O SST8P DB Adapter (P/N 37L1414)
IBM Serial I/O SST16P RJ Adapter (P/N 37L1415)
IBM Serial I/O SST16P DB Adapter (P/N 37L1423)
IBM Serial I/O SST128P Expandable Adapter (P/N 37L1416)
Includes two 4ft (1.2m) Cables
IBM Serial I/O Port Module
Serial I/O PM16DB Port Module (P/N 37L1418)
Serial I/O PM16RJ Port Module (P/N 37L1417)
IBM Serial I/O Power Supply
Serial I/O PS4 Power Supply (P/N 37L1421)
IBM Serial I/O Multiplexer Sets
Serial I/O 16RJ Multiplexer Set (P/N 37L1419)
•Multiplexer Interface Unit
•RJ Expansion Module
•Power Supply
•Test Cable
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)
Serial I/O 16DB Multiplexer Set (P/N 37L1420)
•Multiplexer Interface Unit
•DB Expansion Module
•Power Supply
•Test Cable
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)

Sample Configurations


PS4 (P/N 37L1421)
4ft (1.2m) Cables
Four PM16DB (P/N 37L1418)
SST128P (P/N 37L1416)
PS4 (P/N 37L1421)
16DB Multiplexer Set (P/N 37L1420)
PM16RJ (P/N 37L1417)
PM16DB (P/N 37L1418)
Customer Supplied Unshielded Two-Twisted Pair Cable ≤ 3500ft (1km)
16RJ Multiplexer Set (P/N 37L1419)

37L1414	Serial I/O SST8P DB Adapter[1, 6]
37L1415	Serial I/O SST16P RJ Adapter[2, 6]
37L1423	Serial I/O SST16P DB Adapter[3, 6]
37L1416	Serial I/O SST128P Expandable Adapter[4, 6]
37L1417	Serial I/O PM16RJ Port Module[5]
37L1418	Serial I/O PM16DB Port Module[5]
37L1419	Serial I/O 16RJ Multiplexer Set[5, 7]
37L1420	Serial I/O 16DB Multiplexer Set[5, 7]
37L1421	Serial I/O PS4 Power Supply[5]

(1) Intelligent serial I/O interface card providing eight DB-25 RS232 serial connections using an octopus cable. Support for all ports at 921.6Kbps simultaneously.
(2) Intelligent serial I/O interface card providing sixteen RJ-45 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
(3) Intelligent serial I/O interface card providing sixteen DB-25 RS232 serial connections in a breakout box. Support for all ports at 115.2Kbps simultaneously.
(4) Intelligent interface card providing up to 128 RS232 serial connections (DB25 or RJ45) configured in 16-port increments utilizing any combination of Port Modules and Multiplexer Sets. Includes two 4ft (1.2m) bus cables. Each 4ft cable supports attachment of one to four Port Modules and/or Multiplexer Interface Units for a total of eight per adapter. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421). Support for all ports at 115.2Kbps simultaneously.
(5) Port Modules and Multiplexer Sets attach directly to one of the two standard 4ft (1.2m) bus cables of the Serial I/O SST128P Expandable Adapter (P/N 37L1416) or directly to one or more Port Modules or Multiplexer Sets already attached to one of the cables. A maximum of four Port Modules or Multiplexer Sets may be attached to a single cable. The first Port Module or Multiplexer Set attached to a cable requires a Serial I/O PS4 Power Supply (P/N 37L1421).
(6) Serial I/O Adapters are 32-bit PCI half length cards. A maximum of four Serial I/O adapters (in any combination) may be installed in a single host system.
(7) Requires a customer supplied Unshielded Two-Twisted Pair (Category 3 minimum) cable with a maximum length of 3,500ft (1Km).

IBM ServicePac for Warranty and Maintenance Options for IBM Servers and Server Peripherals

With IBM ServicePac for Warranty and Maintenance Options, you can upgrade the service included with your hardware's original warranty. We offer a number of service options with coverage for parts and labor so that you can choose the package with the service response time that fits your needs. The service period for all options begins with the date of installation of the machine.

Machine Name	Machine Type*	Service Description*	IBM Part Number — Electronic	Estimated Retail Price	Base Warranty
IBM Servers					
Netfinity 1000	8477	3 YR 24x7 4-hour service 3 YR 9x5/next day service	21P2018 21P2017	$925 $500	1 year parts & labor Next business day service response
xSeries 130, xSeries 135, xSeries 330	8654	3 YR 24x7 4-hour service 3 YR 9x5 4-hour service	30L9185 41L2736	$750 $460	3 years parts & labor Next business day service response
Netfinity 3000	8476				
Netfinity 3500	8644				
Netfinity 3500 M10	8655				
Netfinity 3500 M20	8657				
xSeries 200	8478	3 YR 24x7 4-hour service 3 YR 9x5 4-hour service 3 YR 9x5/next day service	21P2022 21P2023 21P2021	$748 $610 $203	3 years parts, 1 year labor Next business day service response
xSeries 220	8645				
Netfinity 4500R, xSeries 340	8656	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service 3 YR 9x5 4-hour service	31L2722 30L9186 41L2737	$2250 $1495 $900	3 years parts & labor Next business day service response
Netfinity 5000/5000 Rack Mounted	8659				
Netfinity 5100, xSeries 150, xSeries 230	8658				
Netfinity 5500/5500 Rack Mounted Netfinity 5500 M10/5500 M10 Rack Mounted Netfinity 5500 M20/5500 M20 Rack Mounted	8660				
	8661				
	8662				
Netfinity 5600/5600 Rack Mounted, xSeries 240	8664				
Netfinity 6000R	8682				
Netfinity 7000/7000 M10 Rack Mounted	8651	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service 3 YR 9x5 4-hour service	31L2723 30L9187 41L2738	$2995 $1995 $1196	
	8680				
Netfinity 7100	8666				
Netfinity 7600	8665				
Netfinity 8500	8681	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service 3 YR 9x5 4-hour service	41L2743 41L2742 41L2739	$3745 $2495 $1920	

Machine Name	Machine Type*	Service Description*	IBM Part Number – Electronic	Estimated Retail Price	Base Warranty
IBM Server Peripherals					
Rack/Storage Expansion Unit	3519	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2745 41L2744	$540 $360	3 years parts & labor
DLT Tape Autoloader	3502 (108)	3 YR 24x7 4-hour service	41L2746	$1000	Next business day service response
DLT Tape Library	3502 (314/R14)	3 YR 24x7 4-hour service	41L2747	$1450	
EXP15 Storage Expansion Unit	3520 (2RU)	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2749 41L2748	$600 $400	
EXP10/EXP200 Storage Expansion Unit	3520 (1RU)	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2751 41L2750	$600 $400	
	3530				
EXP 300 Storage Expansion Unit	3531	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	21P2019 21P2020	$300 $200	
EXP 500 Storage Expansion Unit	3560	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2767 41L2766	$225 $150	
Fibre Channel Hub	3523	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2753 41L2752	$90 $60	
Fibre Channel Controller	3526	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2755 41L2754	$1935 $1290	
NetMEDIA Storage Expansion Unit	3551	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2757 41L2756	$180 $120	
Rack/Storage Expansion Unit	9306 (200)	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2759 41L2758	$255 $168	
	9306 (900)	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2761 41L2760	$450 $300	
	9308 (42X/42P)	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2763 41L2762	$450 $300	
Raid Controller	3542	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2769 41L2768	$1140 $760	
	3552				
SP Switch	3529	3 YR 24x7 2-hour service 3 YR 24x7 4-hour service	41L2765 41L2764	$299 $199	

Offering a variety of service levels to meet your needs

After we work with you and determine that service must be performed onsite by an IBM specialist, we will schedule the service call and set up a target arrival time based on the service level you purchased and activated. We offer national onsite coverage* and a number of service level options to fit your needs and budget. These include:

24x7 2-hour

A service technician is scheduled to arrive at your location within two hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.

24x7 4-hour

A service technician is scheduled to arrive at your location within four hours after remote problem determination is completed. We provide service around the clock, every day, including IBM holidays.

9x5 4-hour

A service technician is scheduled to arrive at your location within four business hours after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in your local time zone, Monday through Friday, excluding IBM holidays. If after 1:00 p.m. it is determined that onsite service is required, you can expect the service technician to arrive the morning of the following business day. For non-critical service requests, a service technician will arrive by the end of the following business day.

9x5/next business day

A service technician is scheduled to arrive at your location on the business day after remote problem determination is completed. We provide service from 8:00 a.m. to 5:00 p.m. in your local time zone, Monday through Friday, excluding IBM holidays.

For complete information on IBM ServicePac services, visit: **ibm.com**/services/its/us/servicepac.html

* These services are available for machines normally used for business, professional, or trade purposes rather than personal, family or household purposes. Not all machine types and models are covered. Service period begins with the equipment date of purchase. Service must be purchased during the original limited product warranty period. Service levels are response time objectives and are not guarantees. A service technician is scheduled to arrive at your location within two or four business hours or the next business day (depending on service) after remote problem determination is completed. For the 9x5x4 hour service, calls dispatched after1:00 p.m. local time, you can expect the service technician to arrive by the morning on the following business day. For non-critical service requests, a service technician will arrive by the end of the following business day. If the machine problem turns out to be a Customer Replaceable Unit (CRU), IBM will express ship the part to you for quick replacement. Onsite 24x7x2 hour service is not available in all locations. External peripherals, such as racks, tape drives, and channel controllers require their own separate service coverage; they are not covered under the attached Machine. Service activation is required immediately following purchase. Visit **ibm.com**/services/its/us/source/wamomxeu.pdf for complete details. For warranty service upgrades for machines not listed above or maintenance service options on out-of-warranty machines call IBM at 1-888-426-4343 or your IBM Business Partner.

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IBM ServicePac for SmoothStart Services are installation services designed to help accelerate the productive use of IBM solutions. Now you don't have to worry about pulling valuable in-house resources from essential daily activities. An IBM services specialist gives you customized service and helps by instructing your technical staff on the basics of each task.

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- Remote project coordination of onsite resources to implement your Netfinity solutions
- Installation and configuration of the rack mount or mini-tower Netfinity server
- Installation and configuration of the network operating system and Netfinity software tools
- Analysis and operational readiness verification of the Netfinity server hardware and software
- Basic skills session to familiarize your staff with the installation and configuration process
- Completion of the IBM product registration on your behalf.

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- Analysis and operational readiness verification of the Netfinity cluster server hardware and software
- Basic skills session to familiarize your staff with the installation and configuration process
- Completion of the IBM product registration on your behalf

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Server Installation

Options include Rack Installation, Server Hardware Installation and Server Hardware with Network Operating System Installation.

- *Rack Installation* — 21P1999
  (supported machine types include: 9306 and 9308)

- *Server Hardware Installation for entry/mainstream* — 21P1995
- *Server Hardware and Network Operating System Installation for entry/mainstream* — 21P1996
  (supported machine types include: 8476, 8477, 8478, 8644, 8645, 8654, 8655, 8656, 8657, 8658, 8659, 8660, 8661, 8662, 8664 and 8682)

- *Server Hardware Installation for enterprise/high end* — 21P1997
- *Server Hardware and Network Operating System Installation for enterprise/high end* — 21P1998
  (supported machine types include: 8651, 8665, 8666, 8680 and 8681)

Server Peripherals

Options include installation for Expanded Storage, Fibre Channel and Tape Subsystem.

- *Expanded Storage* — 21P2010 (supported machine types include: 3520, 3530, 3551 and 3560)
- *Fibre Channel* — 21P2011 (supported machine types include: 3523, 3526, 3529 and 3552)
- *Tape Subsystem* — 21P2012 (supported machine types include: 3502 and 3510)

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*MHz only measures microprocessor internal clock speed, not application performance. Many factors affect application performance.
**When referring to storage capacity, GB stands for one billion bytes.Total user-accessible capacity may be less.
***The quotation function within OrderBUILDER allows reseller specific pricing to be included.
****Tape Drives which utilize data compression technology have storage capacity that will vary depending upon whether the drive is operating in native mode (without compression) or compressed mode. Actual storage capacity will vary based upon many factors and may be less than the maximum possible.
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Printed in the United States of America
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Department K0LA
3039 Cornwallis Road
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G326-8034-23